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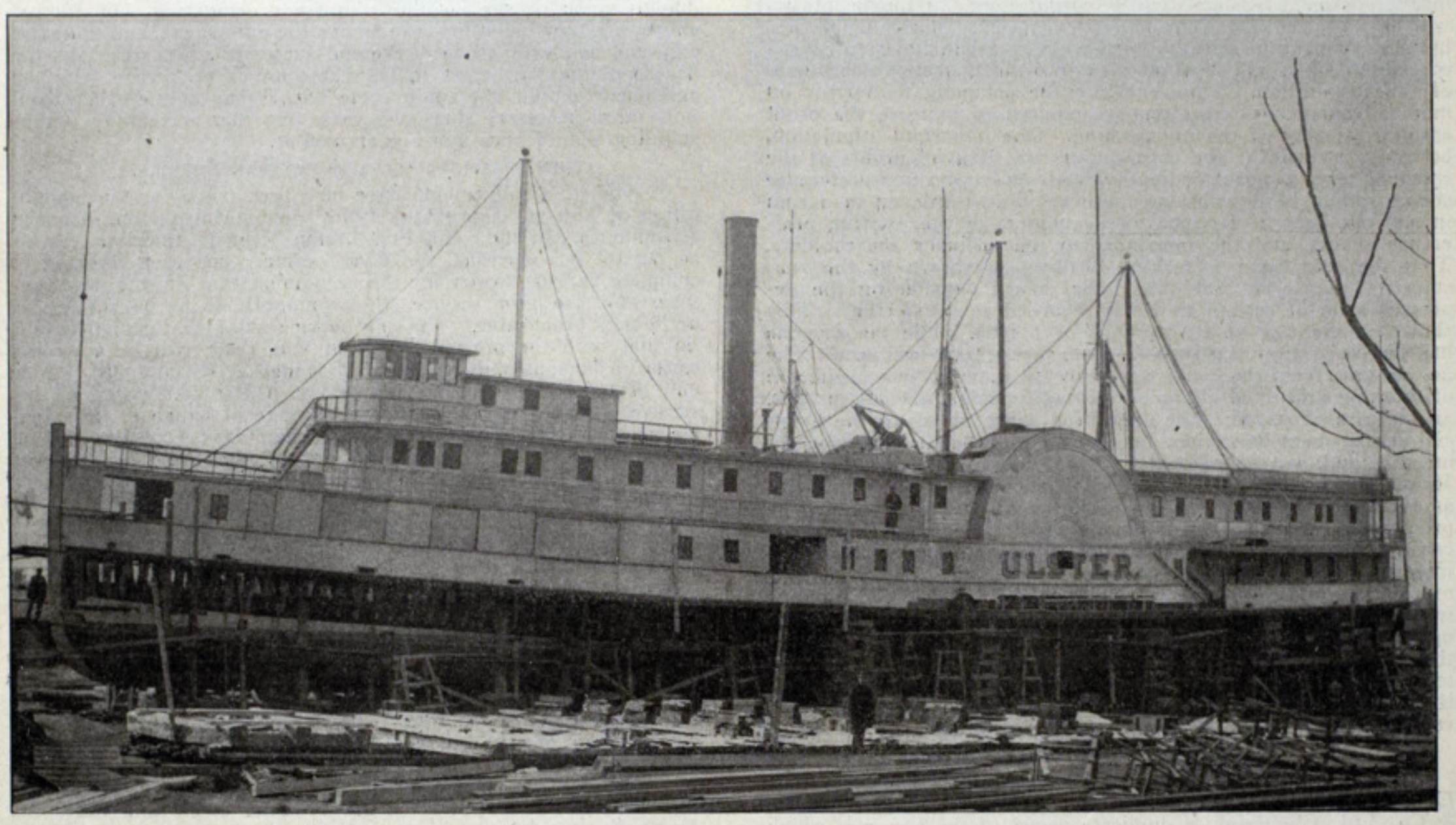
CUTTING A STEAMER IN TWO LONGITUDINALLY.

With monotonous regularity one hears comments on the marked improvements in certain branches of human endeavor. Wireless telegraphy, bloodless surgery and numerous other feats of remarkable progress in scientific application ushered in the twentieth century as a vertiable age of invention. In ship building, and more especially in that unostentatious branch of the profession "ship repairing and altering," many things have been achieved that are deserving perhaps of a little more attention than they are apt to receive. Here is a case in point. The steamer Ulster a well known side-wheeler trading between Saugerties, N. Y. and New York city was becoming deficient in qualities of which an up-to-date freighter should be possessed. The owners submitted the case to a successful expert in diseases to which middle-aged ships are heir. This gentleman—Mr. Burtis—diagnosed the complaint as a gradual decrease of speed and an insufficiency in height of freeboard. Though in former years vessels thus afflicted were pronounced incurable, Mr. Burtis held out hopes for the ultimate recovery of the patient, and the Ulster was conveyed to the Erie Basin hospital. Lengthening a vessel by cutting her in two vertically and building the required length of hull between the severed parts is an almost every day occurrence. But in this instance the ship was cut longtitudinally, and even a tyro in the niceties of ship construction can form an inkling of the heroic treatment resorted to. After successfully cutting the vessel in two a little above the guard screws were placed in such positions as to insure the subjecting of the part to be raised to the least amount of strain. When all the screws had done their work to the limits of their capacity, and, of course, care was taken to have them turned evenly, the thus obtained space between the upper and lower parts of the vessel was blocked. Readjusting the screws and repeating the operation several times the upper part of the Ulster was soon raised the required two feet and the work of building between the parts could be proceeded with. The extraordinary part is that house-movers and not ship builders were employed to do the required raising of the ship's upper half; but after due consideration the employment of these men must be deemed highly advisable. This being the first attempt to make alterations in a vessel by longitudinal cutting in two, the oldest of shipwrights even doubted the expediency of the novel procedure. But the men employed in this instance, not one of whom had the least experience in the art of ship building, looked upon the upper part of the vessel as a house they had to move. This was something entirely in their line, and they set about it in a manner as if anxious not to jar the crockery on the pantry shelves. Through the courtesy of B. C. Miller & Son, the well known house movers of Brooklyn, N. Y., the Review is enabled to present to its readers a view of the Ulster as she appeared while under the operation. The figure in the center of the picture is Mr. Miller's foreman. The following are the vessel's dimensions: Length 205 ft.; beam 30 ft.



The Side-Wheel Steamer Ulster Cut in Two Longitudinally.

AMERICAN-BUILT WARSHIPS IN ACTION.

It is interesting to note in the newspaper prints that in a recent engagement the Japanese were baffled by the "brilliant action and destructive fire of the Retvizan." The Retvizan had been crippled so that she was unable to maneuver. She had been torpedoed and had been driven ashore. As a rule vessels in this predicament are regarded as hors de combat, but not so this superb warship. She served as a stationary battery and proved to be the salvation of the Russian fleet. She beat off the destroyers and smashed and sunk the hulks before they got to the point where they could blockade the harbor. Such a record is a fine tribute to American naval construction, for the Retvizan was built at Cramp's. The Variag, too, another Cramp-built ship, seems to have been so well constructed that not even the desperate fighting at Chemulpo could destroy her. It is now reported that the Japanese have secured her and have found that she can be readily repaired and put into active service. If so, she will materially increase the strength of the Japanese navy at the expense of Russia, for she was built for the Russian government.

MAY STIMULATE SHIPPING.

In speaking of the influence of the present conflict between Japan and Russia in the far east upon shipping, Mr. Calvin Austin of Boston, vice-president and general manager of the Eastern Steamship Co., thinks that it will have a stimulating effect upon shipping. Concerning it he says:

"For some time, negotiations have been under way between the Eastern Steamship Co. and a Pacific concern for the purchase of the steamer St. Croix of the international division of our service, but these have not yet come to any conclusion. Now the demands for boats on the Pacific have become more urgent than ever because of the war between Japan and Russia. Every boat that can possibly be bought by these nations will be snapped up for transports. No large steamers will be left for freight and passenger carrying on the Pacific, and the heads of steamship companies there will then have to come to the Atlantic to get steamers here. To supply the demand for boats on the Pacific coast the different companies on this side of the United States may be called upon to supply the demand."

FUTURE OF MANCHESTER SHIP CANAL.

Sanction Obtained for Deepening the Canal to 28 Feet—Cunard Company Orders a Turbine Steamer.

Liverpool, Feb. 20.—The Manchester Ship Canal Co. have succeeded in obtaining the sanction of the shareholders, notwithstanding the opposition which was threatened, to the two bills now before parliament, the first of which seeks powers to deepen the canal from 26 ft. to 28 ft. and the second confirms the financial arrangement made with the Manchester Corporation. The estimated cost of deepening the canal is said to be £212,683. Mr. Bythell, the managing director, said the Canal company must follow suit with other port authorities. Liverpool had been to parliament and spent £5,000,000 to deepen its docks, and reconstruct the old docks to accommodate the larger vessels. The ratepayers of London had consented to an expenditure of £2,500,000 for deepening the Thames, and the corporation of Bristol were spending about £2,725,000 in constructing a large dock with deep water and deep water access at Avonmouth. The second bill which the directors were authorized to proceed with, will reduce the charge for interest on the loan of £5,000,000 from the Manchester corporation from £225,000 annually to £160,000. Arrears of interest amounting to over £1,500,000 would be covered by the allotment of shares to the corporation. In future interest will be 3 1-5 per cent instead of 4½ per cent. The bill will permit the company to raise by borrowing an additional sum of £2,000,000, which would have priority over the £5,000,000 debentures of the corporation. Thus enabling the company to borrow on more advantageous terms money required to increase the profit earning capacity of the undertaking. One important stipulation, however, is made by the corporation, viz., that all profits of the company after payment of the dividends on corporation preference shares should be divisible as follows: Two-thirds up to a sum in any one year of £200,000 to the holders of the existing preference shares, and the remainder to the ordinary shareholders. That the ship canal is making headway is shown by the substantial increase in seaborne traffic, which considering the depressed state of certain trades is regarded as satisfactory. This shows an increase of 417,000 tons over 1902, while the revenue has increased from £359,000 in 1902, to £397,000 last year. The net revenue from the canal was however reduced by expenditure of working and fixed charges to £90,200, against £80,484 in 1902, an increase of £9,716. The opposition shareholders to the financial arrangement have since the general meeting this week held a meeting and had subsequently a conference with the directors. It was pointed out, so I learn from an authoritative source, that as there was no hope for the ordinary shareholders under the proposed arrangement, so far as normal developments are concerned, rather than run the risk of getting nothing in the way of interest, they should make sure of getting something in the way of capital returned by the corporation being allowed to buy the whole property right out. No definite promise was given to the opposing shareholders on this point, but from the conversation they appear satisfied that the directors will initiate proceedings to that end if they receive an instruction from the shareholders that such is their wish. It is this understanding that I learn has caused the opposition to the bills being withdrawn.

THE CUNARD COMPANY ORDERS TURBINE VESSEL.

The announcement is made today by the directors of the Cunard company that they have ordered from Messrs. John Brown & Co., Ltd., Clydebank, a duplicate vessel of the Caronia, which they recently contracted for with that firm. This new vessel will, however, be fitted with turbines instead of reciprocating engines. The Cronia is expected to be delivered in the early part of next year, and the duplicate vessel a short time afterwards. The vessel, now building, which the Cunard company recently purchased from Messrs. John Brown & Co. for their New York-Mediterranean service has been named the Pannonia. She is 500 ft. long by 39 ft. by 36 ft. moulded to upper deck, with a carrying capacity of about 10,900 tons deadweight, on about 28 ft. 4 in. draught. Besides these three new vessels, the Cunard Line have also recently acquired the Yamuna now named the Slavonia, from the British India Steam Navigation Co. for the New York-Mediterranean service. This latter vessel is of 8,831 tons gross, and 5,635 tons net, with excellent passenger accommodation, as well as great cargo capacity. And a rumor reaches me today that the Cunard officials have been recently inspecting the White Star steamer Arabic with a view to purchasing this vessel also. I mention this because it comes from a good authority, and is significant if true. Apparently the International Mercantile Marine Co. have more vessels on their hands than they know what to do with, for there are two new vessels, uncompleted and unnamed, in the water at Belfast, on which work has been suspended, pending some decision as to their employment. With regard to the two new fast Cunarders for the Liverpool-New York mail and passenger service. The directors have had an important meeting this week and considered the reports of experts in regard to the proposed adoption of turbines for these two steamers of high speed which are to be provided under the agreement with the British government. While no official statement is obtainable, I have excellent authority for stating that no decision on the matter was arrived at.

NEW TORPEDO BOAT DESTROYER.

The torpedo boat destroyer, Arun, built by Messrs. Cammell, Laird and Co. (formerly Laird Bros.), Birkenhead, has made her commissioning trials on the Mersey this week. They proved so satisfactory that she was at once taken over by the officers of the fleet reserve, and proceeded to Davenport. This is the second destroyer of the new type to be delivered by this company, and she has been completed ready for commission at the works of the builders under the new regulations considerably in advance of the contract time.

Mr. Andrew Gibson, ship owner and merchant of Liverpool has just announced his intention of building a Home for the Widows of Seamen, to be erected on the Cheshire side of the Mersey, adjoining the Liverpool Homes for Aged Mariners. The home is to be erected in memory of the donor's father, the late Mr. Andrew Gibson and will have accommodation for forty widows of seamen. The land and buildings when completed will be conveyed to the Mercantile Marine Service Association, the council of which have accepted the donor's generous offer, and will manage the institution in connection with their various seamen and widows' charities. In addition to the land and buildings, Mr. Gibson has intimated that he will endow the home to the extent of £4,000, and it is understood that the total cost will be about £25,000.

There seems to be a likelyhood that time only is required to bring into existence again the minimum freight agreement which for two years has been in operation among the great transatlantic steamship lines of England and America. When the attempt failed recently to bring this about, it is understood that it was due to some of the smaller companies demurring, but further efforts are now being made to revive the agreement, and these are expected here will prove in the end successful. At all events the Liverpool opinion seems to be that there is no reason why the agreement should not again come into force, on the other hand it is more necessary than two years ago that a common understanding should once more be arrived at.

NEW STEAMSHIP LINE TO CENTRAL AMERICA.

Complete arrangements have now been made for the inauguration of Messrs. Elders and Fyffes' new steamship line between Avonmouth (Bristol) and Port Limon, Central America. As far as Bristol is concerned, the dock engineer has been directed to complete various works for the accommodation of this new venture, and the first service to Avonmouth is to be started as early as is practicable. The new service will be a fortnightly one. So that with the present Jamaican line, there will be a weekly cargo of bananas and tropical fruit landed at Avonmouth. Three new boats will be employed by Messrs. Elders and Fyffes on this service, all built specially for the carriage of bananas, and capable of bringing over in refrigerated chambers 46,000 bunches on each voyage. The Matina the first of the three vessels was launched in January, and the second, the Miami, has been placed in the water this week by Messrs. Barclay, Currie & Co. of Whiteinch, Clyde. This success of Bristol will prove a severe disappointment to Manchester which had strong hopes of being selected as the English terminus of the line. As at present arranged the first will be made from Port Limon on April 8th, and thereafter fortnightly.

The German steamship lines seem to have felt the pinch of severe competition since the Cunard Line adopted a free hand with regard to the continental traffic and withdrew from the long standing agreement with North Atlantic passenger lines. The European lines are reported to have decided to establish a regular passenger service between Scandinavian ports on the one side, and New York and Boston on the other. Eight steamers are to be engaged in the service which will be carried on in common by the Hamburg-American Line, the Holland American Line, the North German Lloyd and the Red Star Line.

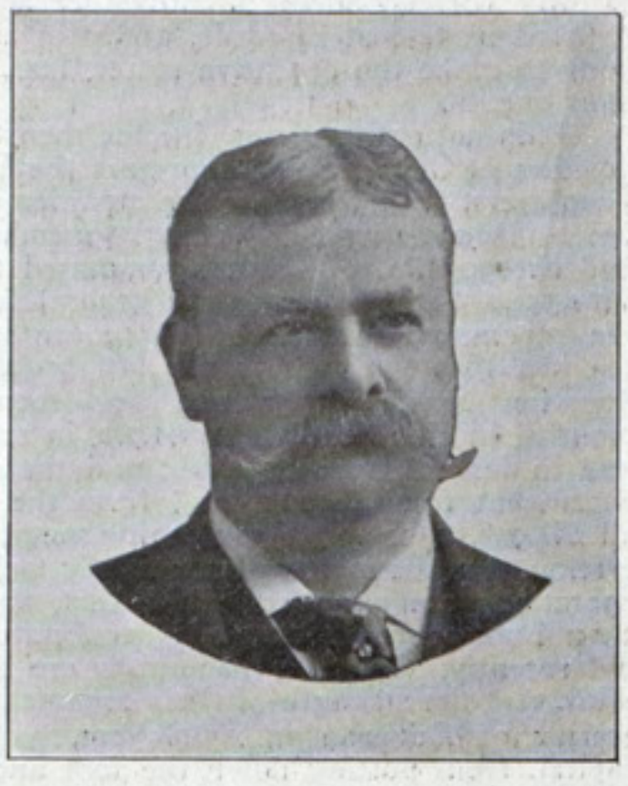
At the 37th ordinary general meeting of the National Steamship Co. to be held in London on the 25th inst., the directors will report that the profit and loss account including the debit balance of £7,970-0-9, brought forward from 1902, shows a debit balance of £50,224 9s 3d. The directors regret the conditions of trade were such during the past year as to necessitate the laying up of the ships of the company for considerable periods, during which the opportunity was taken to thoroughly overhaul the Europe and America. In consequence of the cost of laying up and the cost of overhauling, the working account shows a loss of £17,576 7s 11d. None of the steamers of the company having traded to New York during the year 1903, arrangements have been made whereby the total expenses connected with the wharf at New York, i. e., the rent, insurance, repairs, etc., in addition to the usual amount debited in former years to profit and loss account for depreciation, should be debited to and paid by the Atlantic Transport Company. The fleet of the company is in an efficient condition ,and now consist of the Europe, America, Manhattan and Michigan, having a total tonnage of 26,464 tons.

The efforts of the Ship Masters' Association to have all lighthouses painted white is meeting with the approval of the lighthouse board, and it is quite likely that that color will be adopted for all lighthouses. As a general rule the original color of this important aid to navigation is white, but when a new coat is needed, some other color is used by the keepers in charge, so that at the present time there is no uniformity, and as one official puts it, some of the lighthouses look like barber poles. The ship masters took the matter up at their annual meeting in January and decided to petition for the improvement on the ground that it was difficult at times to discern the stations.

The St. Clair & Erie Ship Canal Co., which holds a charter for the construction of a ship canal from Lake St. Clair to a point on Lake Erie near Pelee island, will apply next session of the Dominion parliament for an act extending the time for the commencement and completion of its undertaking. Col. Tisdale, M. P., Simcoe, Ont., is solicitor for the promoters.

CLEMENT A. GRISCOM.

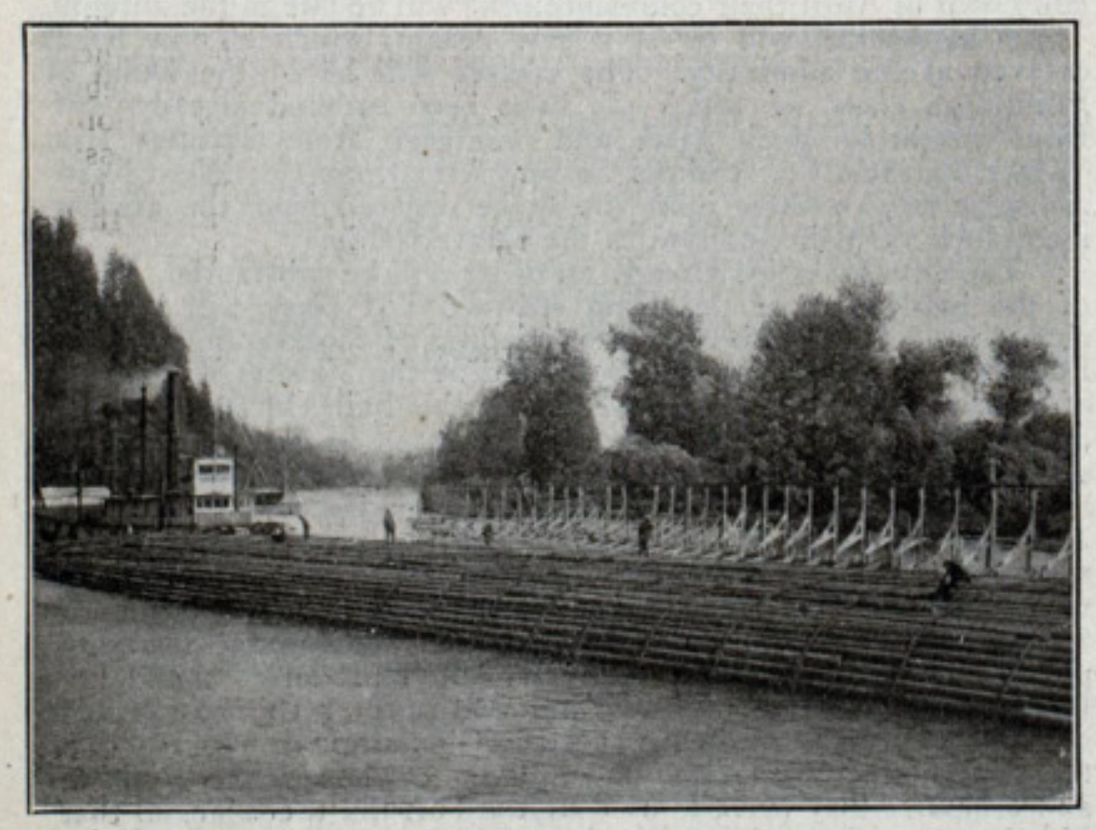
Probably it would be no more than proper to say a word in eulogy of Clement A. Griscom who has just stepped down from the general management of the International Mercantile Marine Co. No man has for the past thirty years been more closely identified with the development of American shipping than Mr. Griscom. When the International Navigation Co., which he projected, was taken over by the International Mercantile Marine Co. Mr. Griscom announced his intention of retiring as soon as a satisfactory organization could be perfected. This intention he has now carried out. It had been his life-long ambition to bring under one management the greatest steamship combination in the world, one that could handle adequately the North Atlantic passenger and freight traffic without waste of duplicate service. Mr. Griscom has been concerned with the active management of steamship traffic ever since he was twenty-one years old, when in 1863 he was made a partner in the firm of Peter Wright & Sons, shipping merchants. In 1871 he began the operation of the American Line with the Indiana, Pennsylvania and Ohio which were the only steamships flying the American flag on the North Atlantic and which were so well built that they are still in active service. It is claimed for Mr. Griscom that during these forty years he never lost a ship, passenger or a bag of mail. In 1888 Mr. Griscom started a new American line, buying out the Inman Line and the American flag was raised by President Harrison on the steamships New York and Paris. Later the St. Louis and St. Paul were built at the Cramp yard of which Mr. Griscom is a director. President Cleveland attended the launching of the St. Louis which was christened by Mrs. Cleveland. Mr. Griscom was also the principal owner of the Red Star Line. Three years ago he secured the co-operation of J. Pierpont Morgan to bring about the consolidation of the various companies under the title of the International Mercantile Marine Co.



Mr. Clement A. Griscom.

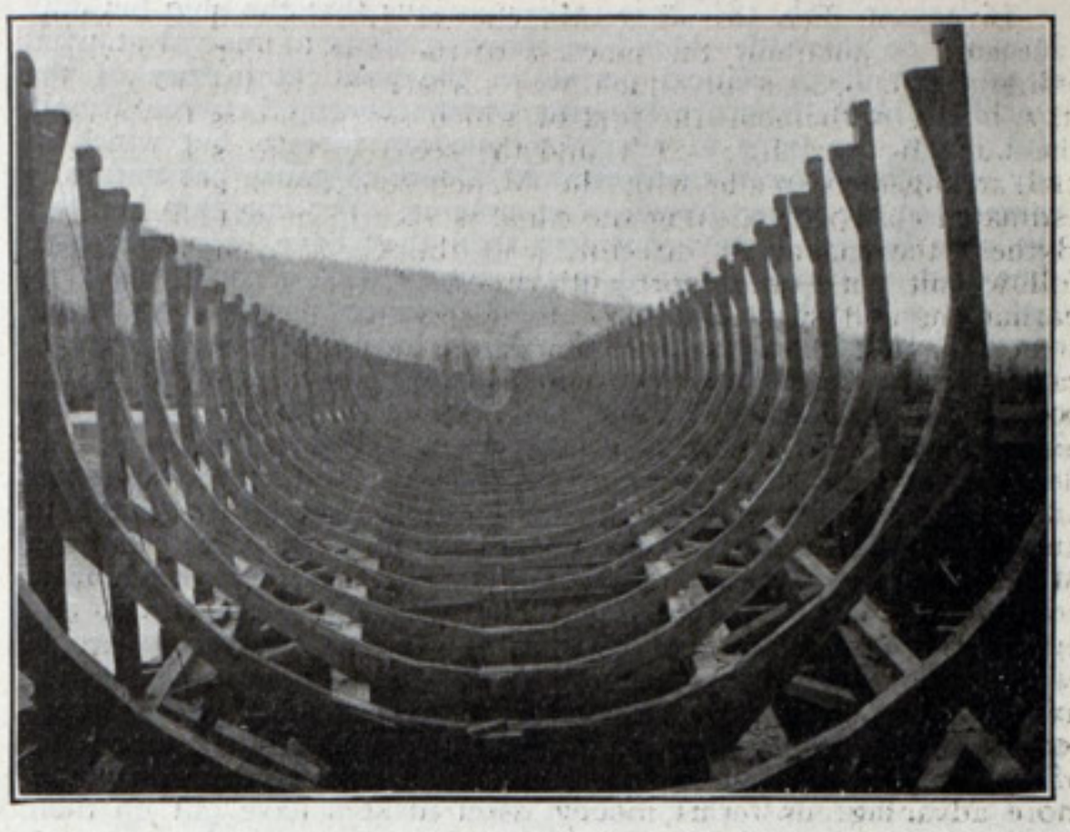
RAFT TOWING ON THE PACIFIC.

Herewith are shown two photographs of the Oregon Rafting Co.'s raft that was towed from the mouth of the Columbia river to San Francisco by the steamer Francis H. Leggett. The raft contained about 600,000 lineal feet equal to about 8,000,000 ft. board measure. The distance from the mouth of the Columbia river to San Francisco is about 550 miles and the trip was made in 5 days and 20 hours. The Leggett carried a cargo of 1,400,000



A Pacific Coast Raft.

ft. of lumber at the same time. These photographs show that the rafting business between Columbia river points and San Francisco is fast becoming prominent. Log towing on the coast is different from log towing on the lakes. It will be observed from the illustrations that the logs are cradled. To build the Pacific coast rafts a great cradle of heavy timbers is built on a slough connected with the Columbia river; a row of piling is driven into deep water; the frame of the cradle floats up and down on this row of piling and is held in place by it; a large scow with a derrick on it is anchored beside the cradle; log booms or small rafts are towed to it, and one by one the logs are lifted by the derrick into the cradle while men fasten them securely with heavy chains and cables. From



Cradle of a Pacific Coast Raft.

80 to 100 tons of chains are used on one raft. When the raft is finished the keys that held the parts of the cradle together are drawn, engines pull away the side of the cradle opposite the piling, and the raft floats out into the water.

NAVAL APPROPRIATION BILL PASSES HOUSE.

Notwithstanding the vigorous opposition of Hon. T. E. Burton upon the naval appropriation bill its course through the house of representatives was not deflected. It passed the house with a very substantial majority to its credit. The bill provides for one battleship, two armed cruisers and a number of lesser vessels. The contest over submarine boats was quite exciting and an amendment was finally adopted which leaves the question of the type of the boats open but increases the amount of appropriation for them. The original provision restricted choice to the Holland and Lake boats, which to say the least was unwise, considering that the submarine is still in an experimental stage. An effort was made to fix the price of armor plates at the figure bid by the Midvale Steel Co., but this question was finally left to the discretion of the secretary of the navy. An ineffective attempt was made to have the eight hour law applied to all ship construction. It seems paradoxical to urge legislation for the improvement of American shipping and at the same time to seriously consider a bill to apply the eight hour law to ship construction. American ship builders suffer under sufficient handicap now, and they could not possibly compete with foreign builders if the hours of labor were diminished.

INSTALLING TURBINES IN FAST SCOUT SHIPS.

The Review recently asked the bureau of steam engineering, navy department, if it had invited competition between American manufacturers for the installation of turbine machinery in certain naval vessels. The department's reply is as follows:

"The navy department has not invited any direct competition between American manufacturers for the installation of turbine engines in certain naval vessels, but it is the intention of the bureau of steam engineering, with the approval of the navy department, to make provisions in its plans for the installation of turbine machinery in one or more fast scout ships, if appropriated for by congress, and with this in view the bureau has been seeking information from the different establishments engaged in the manufacture of such motors.

"This matter having been published in various newspapers has caused the bureau's attention to be drawn to numerous turbine devices and manufacturing concerns intending to enter the field of turbine manufacture, but to what extent this motor will be adopted in the navy for the propulsion of its ships cannot at the present stage be definitely stated.

"The ships in contemplation to be fitted with turbines are to have about 16,000 I. H. P. and a speed of about 24 knots.

"W. H. H. Smith, Acting Chief."

After acting in the capacity of secretary and treasurer of the Delaware River Iron Ship Building & Engine Works, known as Roach's ship yard, John W. Booth has tendered his resignation to take effect March 1. Mr. Booth has accepted a similar position with the new Delaware River Steel Casting Co. which is building a large steel plant along the river of that name at the lower end of Chester. He went with the Roach company to succeed the late William Parker, who was treasurer for 30 years under the elder John Roach, coming from the financial end of the American Steel Casting Co. for the purpose. It is likely that Mr. Booth's place will be filled by Frank Allen, of New York, who has been with the Morgan Iron Works for many years, and associated with the Roach industries all his life.

SHIP BUILDING IN SCOTLAND.

It is Showing Signs of Revival—The Wages Question—New Vessels for the British Admiralty—Trade with Canada—Sailing Ships.

Glasgow, Feb. 18.—It is rather curious that the ship building industry on this side should be showing signs of revival at what is undoubtedly a critical period in the political history of the world. The nations are hanging on the contest between Russia and Japan, the issue of which no one can foresee, but which in any event must be momentous, and a sort of pause has naturally come over the general rush of commerce. Yet our ship builders are now better off for contracts than they have been for some time past, and look forward to the future with a confidence they had not a month or two ago. This is especially the case in the north of England. Scotch ship builders have not booked so freely this year as the others have done, but they are sustained by the animation among their neighbors, as well as by the few orders they have actually received and are receiving. Why there should be any demand for ships just now no man can say. The war is not creating ocean traffic, and it stops a good deal of it, though in respect of the extent to which Russian and Japanese vessels have been withdrawn from trade for military purposes it makes a little outlet for other tonnage. On the other hand there is not any sign of the rush for coal carriers to the east that some people predicted. Meanwhile, the cost of ship building material is advancing in our markets and it does not seem as if wages were going to be reduced any further at present. In the north of England steel makers last week put up their price for ship plates to £5.12.6, and this week Scotch steel makers have put up their price to the same figure, with angles at £5.2.6 and boiler plates at £6.5. The only difference is that the Scotch discount is 5 per cent while the north of England discount is 2½ per cent, so that we are still relatively cheaper. Those middlemen who sold ship plates against the combine £5.5, or less, have been badly caught and are now anxious buyers. Their demands and the actual requirements of the ship builders, make the steel makers very haughty, and a closer organization among them is said to be pretty well arranged. I shall not believe in it, however, till I see it—knowing what diverse interests there are to reconcile. As far as cost is concerned there is no reason for the advance in steel, for pig iron is still at a very low level and the tendency is to increased production. Coal also is very low and drooping.

As to wages in the ship building trade, we are here not quite in the same state of negotiation or hesitation as I have previously reported. The reports of the various trade unions connected with ship building would not seem to encourage their members to resist reductions. The Associated Shipwrights Society intimate dull trade and reduced income. The A. S. E. reports 5,219 members out of 95,298 on out-of-work allowance, and an expenditure during the past quarter of £23,314 on such allowance. Nevertheless, this big trade union's capital fund now stands at £602,760. In the north of England the employers have withdrawn notices of the proposed reductions among machinists for six months, in consequence of the improvement in the position since the notices were issued. But the reduction there among the "black squad" ship yard workers came into operation on Jan. 6 and has been quietly acquiesced in by the men. And now this week the members of the Boiler Makers' and Iron Ship Builders' Society in the Clyde ship yards have agreed to accept a reduction of 5 per cent on piece rates as from Feb. 26. The shipwrights and blacksmiths have not yet intimated their decision, but they have exhibited no opposition and there is no doubt they will follow the example of the riveters of the boiler makers' society. The question of machinists' wages has not been raised on the Clyde.

WAGES QUESTION IN SHIP BUILDING TRADE.

In connection with the wages question in the ship building trade, a labor correspondent writes: "The withdrawal—for that is what it amounts to—of the notice of reduction on the northeast coast is either a sign that things are mending or that the Amalgamated Society of Engineers hold a stronger position than they were supposed to hold. In any case, the employers of the English center of ship building can hardly be congratulated on their tactics, because if it was a blunder to issue the notice, it was a bigger blunder to withdraw it, and leave the ship building 'black squad' at the reduced rates which were forced upon them by their executive. I dare say there is some chuckling over the business in A. S. E. circles, and much to say about the limits of conciliation. In the face of what has happened there clearly is a limit to the caution which may be used in the adjustment of labor differences, but I hope the rank and file of the Boiler Makers' Society will not emphasize the point."

I do not necessarily agree with my correspondent because I quote him. He is a trade unionist, and I want you to hear all sides of the question. He adds: "I am in cordial agreement with the contention that no lowering of wages in a time of depression like this ever attracted new work. It looks like rank heresy to say so, because the world is perpetually pictured as deferring its purchases until the market declines. Supposing it were the case, however, that the ship owner was anxious for cheaper boats, what is he going to do with them when he gets them? He cannot get work for the tonnage he has, and much of it is modern and adapted for economic handling. A revival of the carrying trade is the thing necessary—not cheaper ships—and when that revival comes I fancy the ship builder will benefit to the full extent of the reduction in wages. Of course, the steelmaker has hit the harassed ship builder pretty badly of late, and it is not easy for the ship yard hand to refrain from saying a hard word of him in consequence. But I do not think the steelmaker is possessed of a desire to clip rates on the slightest excuse, and certainly the means of adjusting wages leave the worker with a better chance of sharing in brief bursts of prosperity. The aim of everybody is in the end, however, to make the ship building operatives suffer first and last."

My correspondent is altogether wrong about the effect of reduced wage-cost of trade, and also about the desire of everybody to make the operative suffer, but I fear his view is a common one.

It is natural, perhaps, for the men to think that the financial position of the A. S. E. impresses the Federation of Engineering Employers. Six years ago the organization was, from an actuarial point of view, a wreck. Today its membership is 95,298, and at the end of 1903 its total funds amounted to £602,760.18.7, of which £401,544.0.5½ belonged to the general fund and £201,216.18.1½ to the superannuation fund. These are striking figures, and so is the fact that the gain in the last quarter was £12,190.7.8½. In donation benefit £23,314.11.9 was spent during the last three months, in sick benefit £11,661.7.7, in superannuation £25,219.10.8, and in funeral benefit £3,168; and there was expended from the contingent fund £642.12, and from the benevolent fund £931, in all £64,936.12, or 16.3½ per paying member. The Employers' Federation, it is thought, will not lightly tackle an organization whose operations are on a scale like this, and the men on their side should not court a struggle by weakening the organization as they did recently. But the machinists are absurdly mistaken if they think that the strength of their organization will prevent the Federation of Engineering Employers, with its tens of millions of capital, from putting down the foot and calling a halt whenever the occasion demands. It does not at present—that's all.

Not all ship yards are dull, and Palmer's Ship Building & Iron Co. are at present exceptionally busy with admiralty work. Their yards have all the appearance of a naval base. There are no fewer than fourteen vessels on hand, ten of these being in the water. This total constitutes a record for any private ship building yard throughout the world, includes the first-class battleship Goliath, which is being refitted, and the old battleships Temeraire and Bellerephon, which are being converted—the former into a floating workshop, and the latter into a training ship for boy artificers for the navy. The other boats in the water include the Flirt, one of the 30-knot destroyers, and also six new 25½-knot torpedo destroyers, most of which have had successful trials, and are now being fitted for the fleet reserve. In addition to the other three destroyers of the latest type, there is also on the stocks the third-class cruiser Sapphire, which will be launched in the course of a few weeks.

The first lord of the admiralty has taken incidents in the far east to argue that navy programs must continue and naval preparations be maintained. His remarks are indicative of an increased naval vote, although the greater part of the cost of the two battleships recently bought from Chili will be debited to next year's estimates. This will not influence next year's naval program. In April next three new battleships will be laid down in the government dock yards in addition to the three which were to be given out to contract in the past autumn. The dock yards got the three latter ships instead of contractors, and the question is whether this number of ships is to be laid down in the next financial year, notwithstanding the purchase of the Constitution and Libertad. I learn that it has been decided that instead of three battleships there will be two battleships and an armored cruiser ordered from private firms, in addition to small craft, during the next financial year; but instead of the vessels being laid down in April their commencement will be late in the autumn. These battleships will be of a new design, which is now being evolved at the admiralty. The cruiser will be of the Duke of Edinburgh class, of which six have been ordered already—two from Pembroke dock yard, and one each from Thames Iron Works, Fairfield Co., Vickers Co. and Armstrong Co. Next financial year two or three more are to be ordered from the government dock yards in addition to the contract ship.

The vote for ships already on order will be substantial. Three of the battleships of the King Edward VII class will be concluded; and this will involve the spending of £400,000 on the King Edward, of £500,000 on the Dominion at the Vickers works, and of £400,000 on the Commonwealth at the Fairfield works. The dock yard ship is already out of the contest, as the two contract ships are much further forward. The Devonshire was to have been finished within the next financial year, but this is doubtful. The other five cruisers of the class building by contract—four of them (the Argyll, Roxburgh, Antrim and Carnarvon) on the Clyde—are not due until the summer of 1905. Of ships to be finished there is the second-class cruiser, Encounter, at Devonport, and the third-class cruisers, Amethyst and Topaze, the former with Parsons' turbine and the latter with reciprocating machinery. These are being hurried forward to admit of exhaustive trials under comparable conditions. The sister ships Diamond and Sapphire may perhaps be completed within the financial year. If all expectations are realized we shall have completed before March, 1905, three battleships, an armored cruiser and five other cruisers. There are also five battleships, eleven armored cruisers, eight scouts and a number of destroyers, torpedo boats and submarine boats to advance, and of these two battleships and the six "Devonshire" armored cruisers will be almost completed. The vote for this work may be ten millions, and twelve millions will be needed if the greatest progress possible is to be made.

BRITISH TRADE WITH CANADA.

The Anglo-Canadian shipping companies are making their preparations for the coming passenger season. The Canadian

Pacific Railway Co. intend to take all their continental emigrants via their own route from Antwerp to Montreal and this marks a departure which may have a far-reaching effect on the traffic generally, though from the recent agreement arrived at between the various shipping lines no rate-cutting is contemplated. With regard to the projected Bordeaux and Canada service, Colombier Bros., the contractors, have already acquired some fine ships from British owners and builders; and Donaldson Bros. have acquired a fine new steamer now building at Barrow ——— line. A new line is projected between Hull and Canada, and with all these, and the great developments contemplated by the existing companies, the coming season ought to be a good one for the shipping trade of the Dominion. The improvements in the St. Lawrence should favor the success of these enterprises. The minister of marine, we learn, has ordered the Marconi company to fit up half a dozen points on the river with a complete installation of wireless telegraphy.

The days of sailing vessels are not over, especially in South American trade. William Hamilton & Co., Port Glasgow, have just launched a handsomely modeled four-masted sailing barque of about 3,200 tons gross, the first of two sister vessels which they are building for Hamburg owners for the nitrate trade between Chili and Germany. The vessel, which has a length of 330 ft. B. P., a beam of 47 ft. and a depth of 28 ft. to main deck, has a short poop, a bridge house amidships containing all the accommodation for officers and crew and a topgallant forecastle. She is classed at Germanischer Lloyd's under special survey. Special attention has been paid in the design to minimize labor, and to this end the vessel is fitted with halliard winches, brace winches, sheet winches, and capstans for working of sails, and is further supplied with a 6 H. P. and a 10 H. P. petrol winch. During construction she was superintended on behalf of Germanischer Lloyd's. As she left the ways she was named Hans.

The steel twin-screw steamer Matatua, built and engined by Workman, Clark & Co., Belfast, for Shaw, Savill & Albion Co., London, has just had her speed trials. The Matatua, which is 448 ft. long, and has a deadweight carrying capacity of about 9,500 tons, has been built and engined under special survey for the highest class in Lloyd's registry, and she also fulfils the necessary requirements of the board of trade as a passenger steamer. She is the pioneer steamer in the new regular service which the Shaw, Savill & Albion Co. have just established between Glasgow, Liverpool and New Zealand, and for the requirements of this trade the three main holds of the vessel have been insulated and an efficient system of refrigerating machinery installed. At the trial trip everything worked well and to the entire satisfaction of the owners. The Matatua has a very striking appearance, with a huge funnel 110 ft. from the grate. Workman, Clark & Co. have built a large number of steamers for the Australian and New Zealand frozen meat trade, and in the construction of this large vessel they have beaten all their previous records of rapid construction by delivering in nine months.

Another transatlantic service is planned by the union of North Atlantic Steamship Lines, who have decided to establish a regular passenger line between Scandinavian ports and New York and Boston. Eight steamers are to be engaged, and the service will be carried on in common by the Hamburg-American Line, the Holland-American Line, the North German Lloyd, and the Red Star Line. It is stated that the union has been forced to take this decision owing to the Cunard company having withdrawn from the agreement with the continental companies, and having by its operations rendered competition considerably more acute.

An extension of communication between South America and Europe is designed by the German Navigation Society, who, with a view to increasing the service between Genoa, Brazil and the River Platte, have decided to build several new vessels. With this object the company have asked for tenders from Italian and English as well as German ship builders.

In connection with the war in the far east you will be interested in the following summary of vessels entered at Port Arthur during the year 1903:

	Reg. tons.
British shipping	221,401
Russian	248,976
American	18,760
German	37,633
Norwegian	83,878
Japanese	133,493
Other nationalities	75,768
Total tonnage in 1903	809,898

I notice that you have a kindly memory for the old skippers and old vessels in the Lakes trade. It may interest you to learn that two old-time Quebec shipmasters have just been laid to rest at Troon, near Glasgow. Capt. John Izat was a native of Irvine, and for many years sailed from Troon in command of the Troubadour, the Home and the Samson. These vessels belonged to Samson & Co. of Irvine, and each made two voyages to Quebec each season, lying up in Troon in the winter. Capt. John Webster, Moniaive, who was accidentally killed at Cardiff last month, first came to Troon as an apprentice on the barque Lord Metcalf of Aberdeen, owned and commanded by Capt. Young, and engaged in the Quebec trade. Capt. Webster was retired in Troon, but went for a few voyages in the steamer Clymene, belonging to Donald & Taylor, Glasgow. In the time of these old Quebecers one recalls, the sailing and arrival of the Quebec fleet on the Clyde were events of great interest. The singing of the men as they hove round the capstan was a great attraction, and when they came back with colors flying and guns firing their return was an event of general local importance. Stately craft they were, too, with a fine spread of canvas.

WASTAGE OF BRITISH MERCANTILE MARINE.

The annual summary of ships reported to the registrar-general of shipping and seamen as coming into registry, of ships wrecked, sold, and otherwise removed from British registry for the year 1903 has just been issued. This shows that during the year under review the total number of steamers registered in the United Kingdom was 673, having a total gross tonnage of 1,008,756 and an aggregate horse-power of 127,534. Of these vessels 562 were steel steamers of 983,237 tons and 122,761 H. P. There were twenty-nine iron steamers of 18,780 tons and 2,865 H. P., and eighty-two wood steamers of 6,739 tons and 1,908 H. P. In sail 315 vessels of 31,848 tons gross were registered. Of these 88, totalling 18,377 tons, were of steel; four, of 804 tons, of iron; and 223, aggregating 15,414 tons, were of wood.

The removals of steamers from United Kingdom registry from all causes numbered 354, totalling 508,648 tons gross and 62,815 H. P., of which 155 were steel and aggregated 307,591 tons and 35,252 H. P. The total number of sailing ships whose registers were closed was 428, with a total gross tonnage of 117,774. Of these twenty-two of 27,814 tons were steel, fifty-two of 61,938 tons were iron, and 354 of 28,022 tons were wood vessels. The number of steamers sold to foreigners was 149 of 250,436 tons gross and 29,921 H. P. Italy took some twenty-five steamers of 65,505 tons gross, and nine sailing vessels of 9,426 tons; Japan bought eight steamers of 23,350 tons; Norway had fourteen steamers of 19,690 tons, and thirty-two sailing vessels of 29,680 tons; Germany took thirteen steamers of 25,630 tons, and two sailing vessels of 1,923 tons; Belgium seven steamers of 21,194 tons; Greece eleven steamers of 20,138 tons; France twenty-five steamers of 19,748 tons, and nine sailing vessels of 709 tons; Holland relieved us of eight steamers of 7,930 tons, and three sailers of 168 tons; Sweden took ten steamers of 18,533 tons gross, and one sailing vessel of 767 tons, and Russia purchased from us five steamers of 5,753 tons, and one sailing vessel of 1,240 tons. Spain, Denmark, and the United States were also customers, and "other countries" figure for fourteen steamers of 18,414 tons, and four sailing vessels of 3,173 tons. It is noticeable that of the total removals the steamers sold to foreigners exceeded in tonnage those that were lost and condemned, the figures being 149 of 250,436 tons sold, and 173 of 198,834 tons lost, etc. The causes given are as follows:

	Steam.		Sail.	
Cause.	No.	Gross tons.	No.	Gross tons.
Wrecked	35	49,956	65	19,400
Stranded	24	25,469	28	15,498
Lost	9	12,997	25	3,444
Broken up	41	49,307	83	4,966
Abandoned	..	.....	9	1,413
Collision	18	16,442	17	2,681
Missing	9	10,191	11	8,518
Foundered	12	8,808	19	2,321
Burnt	4	15,904	5	1,406
Condemned	..	.....	3	141
Other Causes	21	9,760	72	4,419

There were eighty-eight sailing ships of 50,038 tons sold foreign, and 337 of 64,207 tons lost, etc. Vessels reported registered in the British colonies for the year 1903 number 308 steamers of 133,716 tons gross, and 696 sailing vessels of 56,738 tons gross register. The removals from registry are 102 steamers of 51,530 tons gross, and 496 sailing vessels of 48,475 tons.

The net gain in United Kingdom steamers is 319 vessels and 506,108 tons gross, and in sail a loss of 113 vessels and of 83,179 tons. In the case of the colonies there is a net gain of 206 steamers and 82,186 tons, and a net gain in sailing vessels of 200 vessels and 8,263 tons. The total net gain therefore for the year 1903 of British tonnage is 612 vessels aggregating 513,378 tons gross.

SUEZ CANAL TRAFFIC.

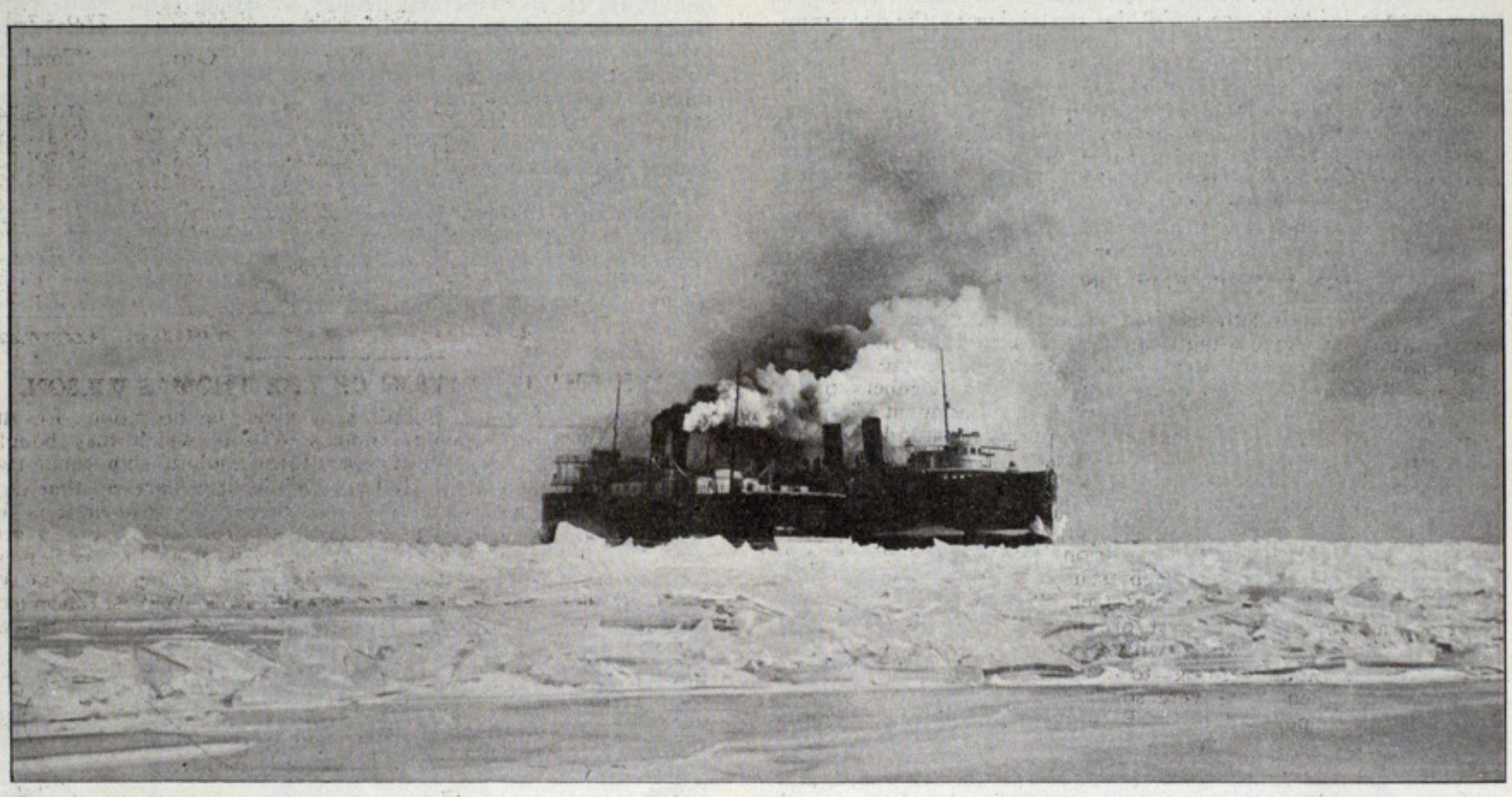
The following is a return of the navigation through the Suez canal for four weeks ending Jan. 29, 1904, compiled by Edward A. Willard & Co. of New York, showing the number of vessels coaled under the various flags and the amount of tonnage:

	No of Vessels.	Amount of Tonnage.
American	1	4,114
Austrian	8	25,828
British	173	584,763
Danish	1	1,350
Dutch	14	40,903
Egyptian	1	845
French	16	51,121
German	42	167,671
Italian	7	15,286
Japanese	6	21,377
Norwegian	4	10,738
Russian	11	23,776
Spanish	2	5,634
Turkish	6	9,723
Total	292	963,129

NEWS OF THE GREAT LAKES

TERRIFIC ENCOUNTER WITH ICE IN LAKE MICHIGAN.

Never before in the history of the Pere Marquette car ferries have they experienced such a terrific winter. The slush ice this winter is fully double what it has been any wanter since the car ferries have been running on Lake Michigan. During the whole month of February, Lake Michigan has been entirely frozen over with the exception of a few spots of open water here and there which was partly frozen with a thin sheet of iron which broke up and refroze continually. The condition of the ice in the bay at Manitowoc is as bad as any place on Lake Michigan with the possible exception of Ludington, Mich., the other terminus of the Pere Marquette car ferries' run. On Feb. 13 the No. 15 was in the ice near Kewaunee. The No. 18 was sent light from Ludington to release her. When within sight of Kewaunee the No. 18 could see nothing of the No. 15 and concluded that the No. 15 had entered the harbor. No. 18 then went back to Ludington. After loading her complement of cars, she again started for Manitowoc. When within sight of Two River point, she could see No. 15 fast in the ice. The No. 18 then started after the No. 15 and after cutting her out they both started for Manitowoc, the No. 18 leading. When within 5 miles of Manitowoc in Manitowoc bay, the No. 15 concluded that she could make better time by herself and started to cut a new channel past the No. 18. In so doing she finally was held fast in the ice. She then blew for the No. 18 to check down and as soon as the No. 18 had checked, she too, became fast. To add to their troubles, the ice at this time commenced to jam in towards the beach carrying the car ferries with it and wedging them in with terrific force with about 25 to 35



Pere Marquette No. 17 Backing Alongside of No. 15 and Breaking Ice with her Wheels.

Car Ferry Pere Marquette No. 18 in Foreground. Pere Marquette No. 17 Covering her own Channel so as to be Able to Return to Harbor.

feet of water under each car ferry. The position they finally came to was within a mile of shore and about a mile from each other with ice piled as high as the main deck. To keep the propellers from freezing in they kept the engines moving continually. Early Monday morning of Feb. 15 car ferry No. 17 started from Milwaukee to release them, arriving there about noon. Then started a terrific battle with the ice which lasted for four days. The ice was plowed foot by foot and thrown up to a height of 15 ft. on either side of the ferries, presenting a regular wall channel in which the No. 17 would return as far as the harbor now and then to keep it open so as not to allow herself to be closed in. The thermometer was below zero through the days that the car ferries were imprisoned. The No. 17 finally reached the No. 18, which was nearest the harbor and maneuvered back and forth in the ice in a radius of a quarter of a mile on either side so as to get room to work the ice away from the No. 18. In places the ice seemed to go clear to the bottom for when the propellers were worked strongly the ice was turned up, bringing sand from the bottom deposited on the cakes. It took the No. 17 from Monday noon of Feb. 15 to Tuesday afternoon, Feb. 16 to release the 18. Then together they started for the No. 15 a mile away, plowing through windrows that seemed almost impassable, and when one car ferry became fast the other would plow her out. They finally succeeded in reaching the No. 15 after cutting a parallel channel and working the ice back of them. Together they worked a greater part of the night, cutting out the No. 15 which had become imbedded in heavy windrowed ice, finally releasing her about 7 o'clock the morning of the 17th. Then all three started for the harbor, presenting a very fine appearance, and reminding one of the victor's returning from battle. After a few hours of hard plowing they finally succeeded in getting into the harbor and into the slips. Thus ended without doubt the worst battle that they have experienced during the time the Pere Marquette car ferries have been running on Lake Michigan.

NO AGREEMENT ON ORE PRICES.

It looks now indeed as if there would be no Bessemer Ore Association for the coming year. There appears to be no common point upon which the producing-consuming interests and the purely merchant ore men can meet. The members of the Bessemer Ore Association held a two days' session in Cleveland during the present week, but were compelled to adjourn sine die without reaching any agreement at all. Two propositions were presented: one to fix the rate of old range Bessemer at $4 per ton with an unlimited output and the other to fix the rate at $3.80 per ton with a limited output of from 14,000,000 to 16,000,000 tons. The first proposition was favored by the producing-consuming interests, represented by the Steel Corporation and the big independent steel concerns; the other was put forward by the merchant ore man. Both sides stood out for their own proposition without a compromise and finally adjourned without coming to any agreement. Among the merchant ore men there were some who even favored putting a price of $3.50 upon old range Bessemer, and the price of $3.80 fixed by them was in itself a compromise. The merchant ore men were unwilling to consent to the $4 rate because they thought that it would be putting the independent consumers, who are of course their chief customers, at a disadvantage in competition with the great steel companies that own their own deposits. With no agreement, each iron ore producer can make his own price.

The estimate of a movement of 14,000,000 tons, which is the one that has been commonly made during the past few weeks, is based upon the stocks at the lower lake docks and at the furnaces and upon the general trade outlook. There has been so little movement of ore from dock to furnace that the supplies available are regarded as sufficient to keep the furnaces going until next September. Various explanations are offered for the recent purchase of 50,000 tons of pig iron at $13 per ton by the Steel Corporation. Whatever may have been the motive, the effect of course has been good. Iron ore men expect that buyers will be quite leisurely in making purchases. Conditions in every way point to a very late opening of navigation.

BIDS FOR LIGHTSHIP OPENED.

Bids have been received by Com'dr Lucien Young, in charge of the Lake Michigan lighthouse district, for the construction of a lightship to mark Peshtigo shoal in Green bay. The specifications call for a vessel 75 ft. long, 21 ft. 6 in. molded beam and 9 ft. 8 in. depth of hold. Bids were received from but two ship building concerns, the Shipowners' Dry Dock Co. of Chicago and Johnston Bros. of Ferrysburg, Mich. The latter firm put in the low bid of $13,950 and will probably receive the contract, although the award has not yet been made by the Washington authorities. The ship is to be built of steel and will be without motive power. It will be known as lightship No. 77. Marine men are somewhat at a loss to understand why so much money should be expended in marking a shoal in such an out-of-the-way spot. In former times many lumber boats traded in that part of Green bay, but at present few ships ever find themselves in that vicinity. The lightship will probably be in place by midsummer. Work is now under way on the lighthouse on St. Martin's island, near the Poverty island passage into Green bay, and on the new pier light at Michigan City.

SHIPMENTS OF GRAIN FOR NINE SEASONS.

Following is a summary, compiled by George A. Tomlinson of Duluth, of the shipments of grain from the port of Duluth-Superior during nine seasons. It will be observed that the movement of wheat has not increased since 1895; indeed the largest shipment of the cereal was in 1898. The most important development has been in flax and oats, Duluth having become the largest primary flax market in the world. The acreage to be devoted to grain this season is likely to be greater than ever before as farmers will be stimulated to extraordinary energy on account of the high value of all cereals.

Year.	Wheat. Bu.	Barley. Bu	Flax. Bu.
1895	35,953,723	2,038,055	2,085,471
1896	50,272,167	6,308,524	5,596,855
1897	37,445,337	4,886,059	6,380,062
1898	51,556,140	3,068,131	6,365,505
1899	42,809,114	3,459,392	9,225,933
1900	29,993,243	2,529,273	5,969,048
1901	37,586,879	2,471,665	12,539,005
1902	40,601,899	5,014,129	13,436,560
1903	26,682,020	5,782,047	15,417,285
	352,900,522	35,557,275	77,015,724

Year.	Oats. Bu.	Rye. Bu.	Corn. Bu.	Total. Bu.
1895	787,352	261,140		41,125,741
1896	4,388,362	872,172	872 172	68,310,252
1897	6,283,132	853,571	853,572	56,701,733
1898	4,977,282	2,963,503	3,521,637	72,452,198
1899	2,815,272	909,030	7,939,605	67,158,346
1900	255,058	579,648	3,404,103	42,730,373
1901	1,684,683	760,608	5,149,399	60,192,239
1902	969,861	1,147,689	71,134	61,241,272
1903	4,104,122	809,794		52,795,268
	26,265,124	9,157,155	21,811,622	522,707,422

PRESENT CONDITION OF THE THOMAS WILSON.

Wieland Bros. of Duluth have given up operations for the present upon the steamer Thomas Wilson, which they bought after she was sunk just outside of the Duluth ship canal two years ago by the steamer Hadley. While they represent that they have not abandoned their efforts to recover the steamer it is the opinion of competent engineers that she cannot be successfully raised. She lies in 72 ft. of water 6,000 ft. from the canal piers at Duluth. A correspondent contributes the accompanying sketch of the present condition as discovered by J. B. Wanless, an expert marine diver, at Duluth. Point A indicates where the Hadley

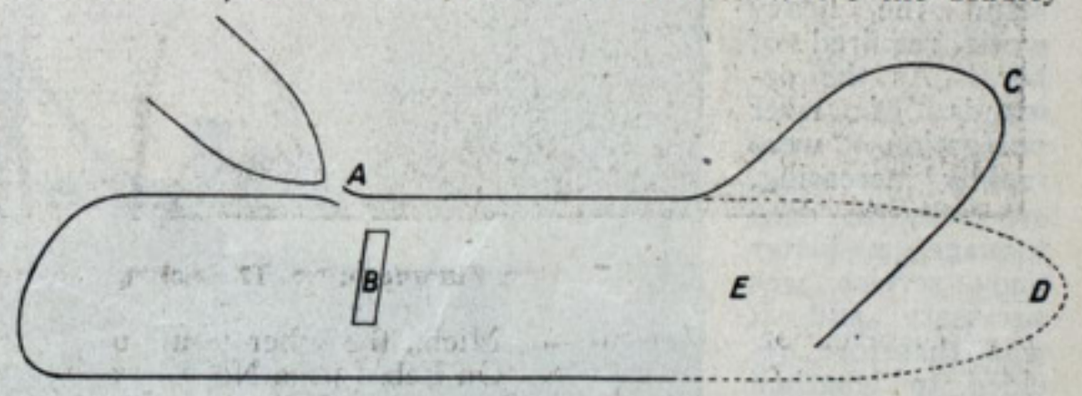


Diagram of Sunken Steamer Thomas Wilson.

struck the Wilson; point B indicates the second hatch forward of the coal bunkers. The opening at A from port to starboard is 4 ft.; the opening at A fore and aft is 1 ft. She is cleanly cut perpendicularly from deck to water bottom and to within about 18 in. of the rail. A crack extends diagonally from the hole to hatch B. Her cabins are all gone. The only thing remaining on the upper deck is the cook stove and steering wheel. The stern of the vessel is otherwise intact. She is broken in two at point E. The distance C-D is 75 ft. and the distance C-E is 120 ft. She is lying on an even keel. Starting at hatch B to a point about 50 ft. from her bow her decks are a torn, twisted and bent mass of scrap iron, her decks resting in place on her cargo of ore. Her timber heads are horizontal instead of vertical in several places, especially near the break and her top sides are drawn inwardly.

ANOTHER GRAIN ELEVATOR AT FORT WILLIAM.

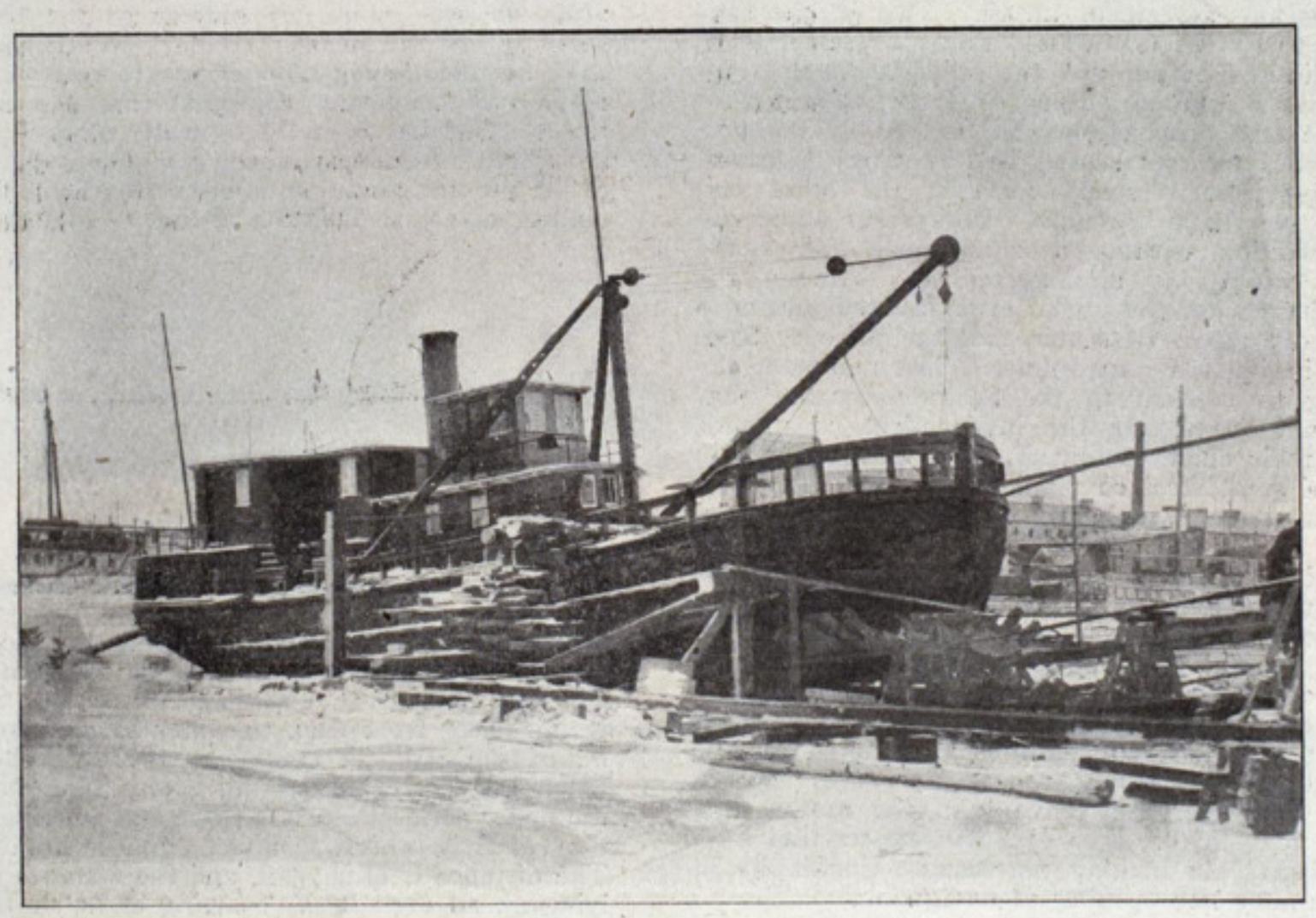
Duluth, March 2.—Another large grain elevator is to be built at Fort William, this time for the Ogilvie Flour Mills Co. It is to be of steel and will be put up by the McDonald Engineering Co., of Chicago. It will have capacity for 500,000 bu., and is to be ready by Sept. 1, next. One of the most peculiar movements of grain that have been noted is the shipment of 500,000 bu. of wheat from Port Arthur and Fort William westward to Keewatin, where the mills are unable to get enough grain from the west and are therefore drawing on the amounts in store at the lake. It is a distance of about 350 miles that this wheat has to take the back track toward its origin. Owing to the steady advance and the small amount of high grade wheat to be had west of Winnipeg, the milling company was forced to buy in this way.

Supt. A. A. Schantz of the D. & C. Line announces the route to Cleveland will be opened March 25, ice permitting.

No. 2. Frame in Place and Portion of Bottom Plank on.

LENGTHENING THE DOMINION STEAMER SCOUT.

Accompanying this article is a series of photographs showing the work of lengthening the Dominion steamer Scout at the ship yard of the Davis Dry Dock Co., Kingston, Ont. The Scout is owned by the Canadian government and is employed in handling buoys on the St. Lawrence river between Kingston and Quebec. She was built seven years ago at Morrisburg, Ont. She has twin screws and is driven by high-pressure engines, 10 by 12, and Scotch boiler working under 130 lb. pressure. She was 75 ft. long, 23 ft. wide, 10 ft. deep and 7 ft. 6 in. draught, with very full ends, bluff scow bow, built very heavy with double frame to stand the heavy work required of her. As the demands of river navigation were rapidly increasing, especially in deep tonnage, a better buoy service was necessary, and it was therefore decided to lengthen the Scout 25 ft., change her engines, increase her speed, lighten her draught and improve her accommodations at a cost of about $15,000. Contract for lengthening the steamer 25 ft. and placing steel arches in the hold was given to the Davis Dry Dock Co. of Kingston, who undertook to deliver the steamer complete. At the time the contract was taken the steamer was frozen solidly in 12 in. of ice with no dock or railway open upon which to do the work. The contractors decided to raise the forward portion of the steamer above water (the stern being in 8 ft. of water, resting on hard bottom), by placing through the hull below the clamp strakes a heavy stick of oak timber under which hydraulic jacks were placed on each side of the steamer. Piles were driven on each side of the steamer on which to work the jacks, making a secure and solid foundation.



No. 1. Vessel in Position just after Keel had been Laid with Portion of Bottom Frame in Place.

The next problem facing the contractors was the completion of the under portion of the hull which still remained under water. Under the contract all planks removed from the old portion of the hull to make connection for the new portion were to be stripped to original butts, thus preserving the steamer's original strength. The contractors decided to build a pontoon about 25 ft. square and 4 ft. deep and to place it under the bottom of the steamer. This was successfully done and when the water was pumped out it gave the workmen a comfortable and dry place to work in. Piles were then driven along the line of the new keel when it was laid. The illustrations show the different stages of the work. No. 1 shows the vessel in position just after the keel had been laid with portion of bottom frame in place; No. 2 shows the frame in place and bottom plank on; No. 3 shows the frame all completed, bottom planked and vessel again lowered in water ready to receive top sides and deck; No. 4 shows vessel moved to dry dock ready to receive new machinery and finishing touches; No. 5 shows steamer complete after trial trip with all outfit in place.

As stated, the steamer had twin screws, driven by 10 by 12 high-pressure engines. In making the change these were removed and fore and aft compound substituted, 9 and 16 by 14, using the same boiler, shafts and wheels. The advantages gained by the changes were as follows: Draught of steamer reduced from 7 ft. 6 in. to 6 ft. 2 in.; speed increased from 7½ to 10 miles per hour; saving in fuel from 10 to 15 per cent. The steamer is equipped with steam winches, capstans and all known appliances for assisting in the work. The machinery was furnished by the Kingston Foundry.

CANADA'S NEW LAKE MARINE.

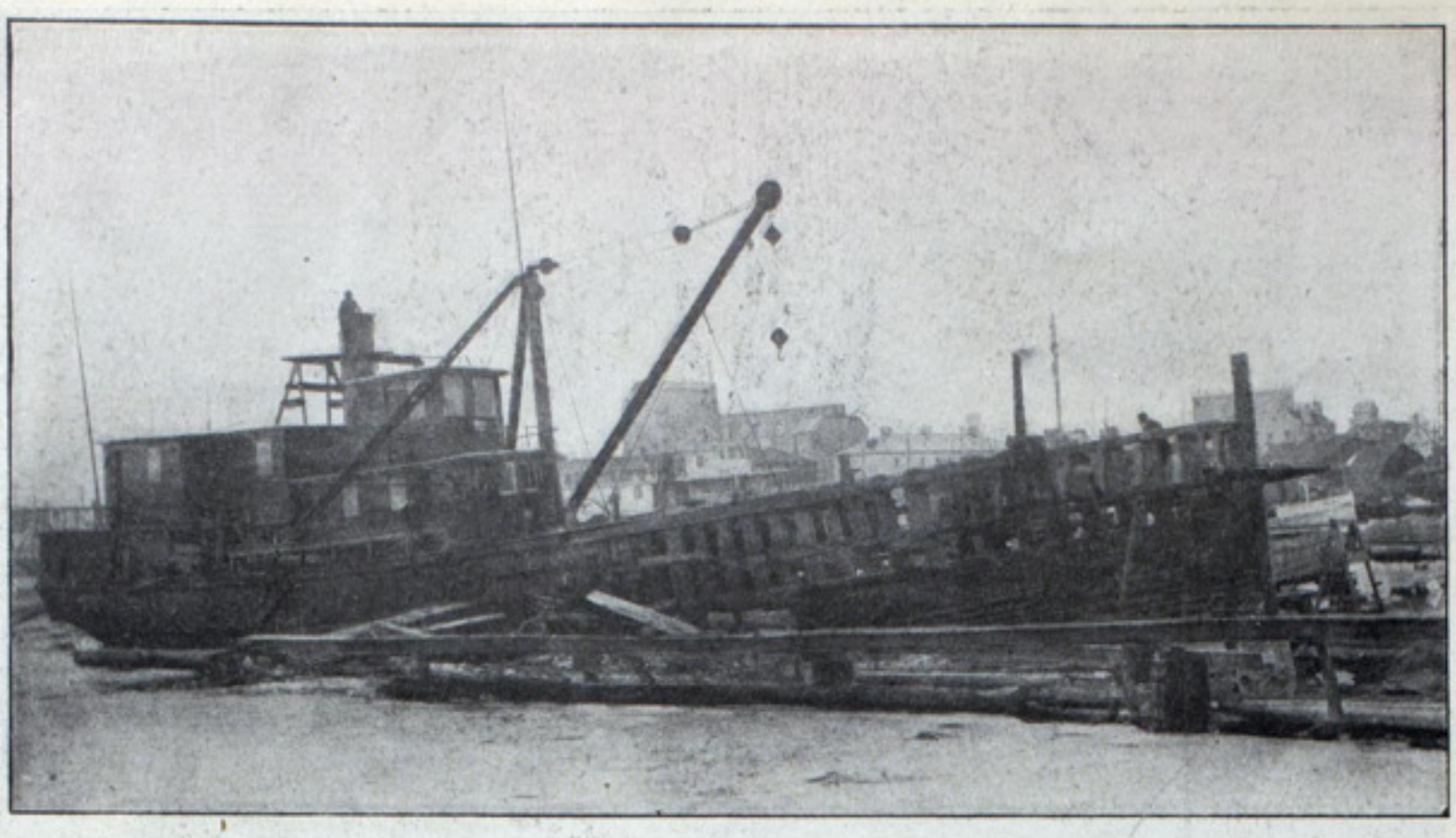
While the progress of Canada in almost every line during the past few years has been remarkably great, there has been no way in which it has been more marked, especially during the past three years, than in the almost phenomenal growth of the merchant marine trade on the upper lakes. This growth can be said to have commenced in the spring of 1901, and since that time has been so rapid that the fleet traveling between Lake Superior and the lower lake ports has doubled in number, while the carrying capacity is about three times that which it was at the beginning of this three-year period, a fact of which Canada can justly be proud.

Two years ago shippers found it necessary to petition for a temporary suspension of the Canadian coasting laws, so that the Americans might engage in the trade, and relieve the blockade at the ports of Fort William and Port Arthur, where all the grain from the west is trans-shipped on its way to the markets

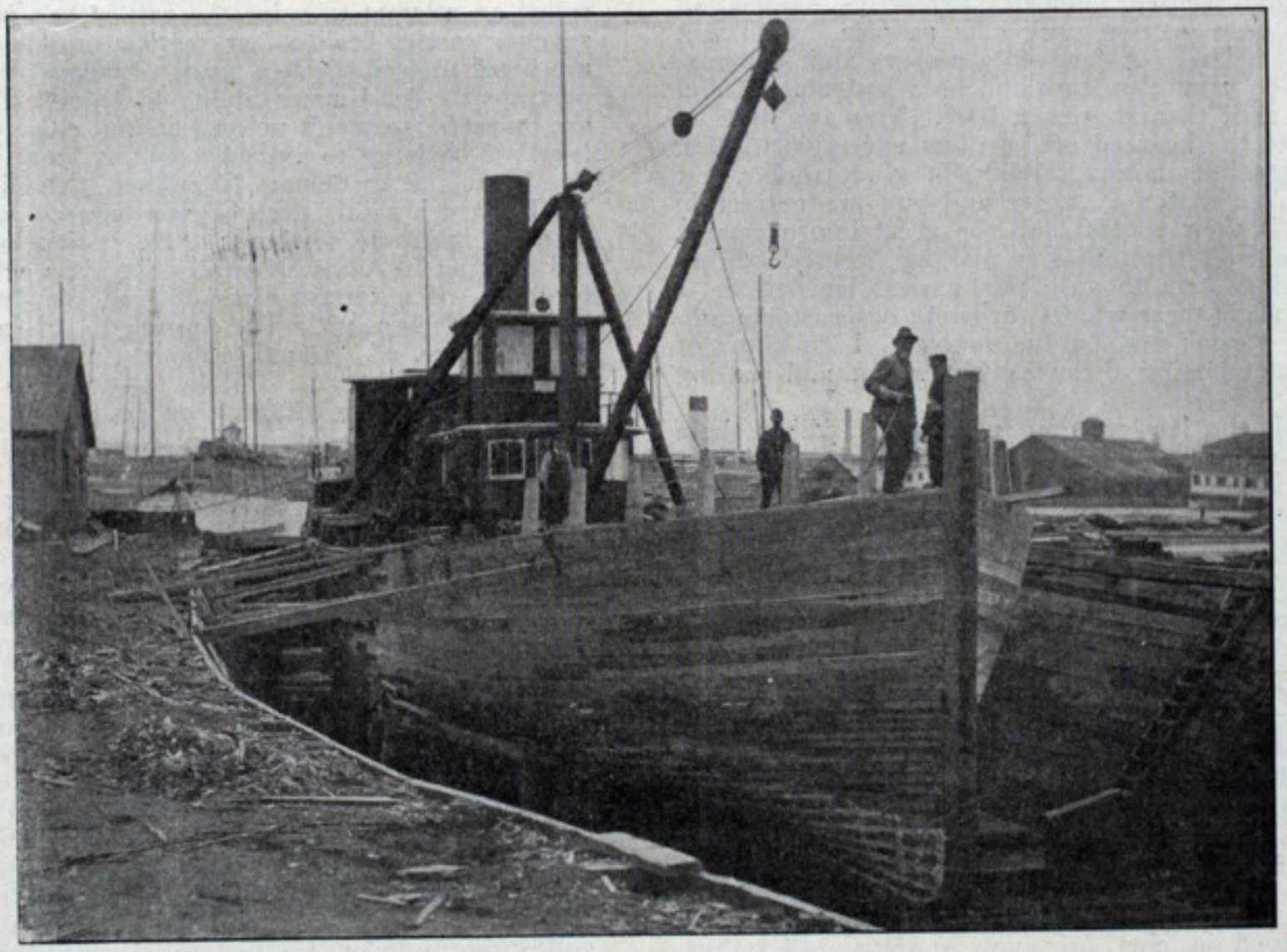
of the east. Since that time, however, there have been enough boats added to the Canadian fleet to handle the grain, although the shipments being offered are increasing very fast, and it will be necessary for the vessel owners to keep continually adding to the carrying capacity of their fleets on the lakes.

The first of the new companies to go extensively into the lake carrying business during the past few years was the Algoma Central Steamship Line, one of the companies organized by F. H. Clergue. They brought a fleet of carriers out from England and placed them on the inland lakes during the season of 1901. They were the steamers Paliki, Leafield and Theano. To these they added the schooners H. A. Barr and J. J. Barlum, purchased from United States concerns, and the tow barge Agawa, which was built at Collingwood. The Agawa is 379 ft. in length, and is one of the finest boats of her type on the lakes. The Barr was subsequently lost on Lake Erie. It was the intention of the Algoma Central people when they put the ocean type of boats on the lakes to take them to the ocean and engage in the trade there during the winter months. This was tried the first winter, but was accompanied by so much trouble and so little fortune, in competition with the other lines operating continuously on the Atlantic, that the idea was given up the first season.

Last year the Canadian Lake & Ocean Navigation Co., with headquarters at Toronto, entered the trade, and they also went to England for their boats, for the double reason that they could get them there somewhat cheaper, and use them in bringing over cargoes, and because they could not wait for the Canadian ship yards to supply their demand. The boats were not constructed to order in England, but were purchased from the companies operating them. This company bought the four boats which comprise what is known as the Turret fleet. They are of a type distinctly different from anything on the lakes, their construction being somewhat like a combination of the whaleback and the ordinary steam barge, with the engine rooms amidships. These boats were the Turret Court, Turret Chief, Turret Crown and Turret Cape. Three more were added by the Canadian Lake & Ocean Navigation Co. this season, being the J. H. Plummer, A. E. Ames and H. M. Pellatt. The Turret boats have a carrying capacity of about 105,000 bu. of wheat each. The other three are intended principally for the package freight business. All vary in size from 250 to 260 ft. Boats larger than this cannot pass through the Welland canal.



No. 3. Frame all Completed, Bottom Planked and Steamer again Lowered in Water ready to Receive Top Sides and Deck.



No. 4. Vessel Moved to Dry Dock ready to Receive Machinery.

CANADIAN SHIPPING NOTES.

An important amalgamation for operating purposes only is being arranged between the Canadian Lake & Ocean Navigation Co. and the New Ontario Steamship Co. of Hamilton, Ont., by which a bi-weekly freight service each way is to be established between Montreal and Port Arthur and Fort William, calling at Toronto and Hamilton, as well as some other intermediate ports, including one or more in the United States. At present the management do not care to give details, but it is understood that the service will be started on the opening of navigation, that there will be no change of ownership of the vessels, the only arrangement being that each line will supply a sufficient number of steamers to carry on half the service, and jointly the necessary officials will be engaged to secure and handle the freight. In 1903 the Canadian Lakes & Ocean Navigation Co. operated certain of its steamers for package and general freight between Montreal and Port Arthur, but did not call at Toronto; and some of the New Ontario Steamship Co.'s steamers worked on the same route independently or in conjunction with another line. The steamers available for the service are all English-built expressly for the lake trade and of full canal size. They are: H. M. Pellatt, J. H. Plummer and A. E. Ames of the Canadian Lakes & Ocean Navigation Co.'s line, and probably Donacona, Strathcona and Waconda belonging to the New Ontario Steamship Co.'s fleet. A. E. Cowan, heretofore traveling freight agent for the Northern Navigation Co., is spoken of as the freight agent of the new line.

The Niagara Navigation Co. proposes during the coming summer to make six trips a day each way between Toronto and Niagara Falls, instead of five as formerly.

The Helen Shipping Co. has been incorporated under the Dominion Companies' act to purchase the Liverpool schooner Helen, and to carry on a general coasting business in Canada and elsewhere. The capital is $12,000 and the head offices of the company are at Liverpool, N. S. S. B. Davis, mariner, and C. S. P. Robbins, merchant, Liverpool, are mainly interested in the venture.

The Dominion department of marine has issued a bulletin containing preliminary sailing directions for portions of the Canadian shore of Lake Superior, based on the observations made during 1903 by the members of the hydrographic survey on board the Lord Stanley. The sailing directions have been written by W. J. Stewart, who was in charge of the hydrographic survey work for the Canadian government, and will replace the information contained on pages 20 and 21, 26 and 27 of bulletin No. 13 of the survey of northern and northwestern lakes, published by the United States war department in 1903.

LICENSED OFFICERS FOR SMALL MOTOR BOATS.

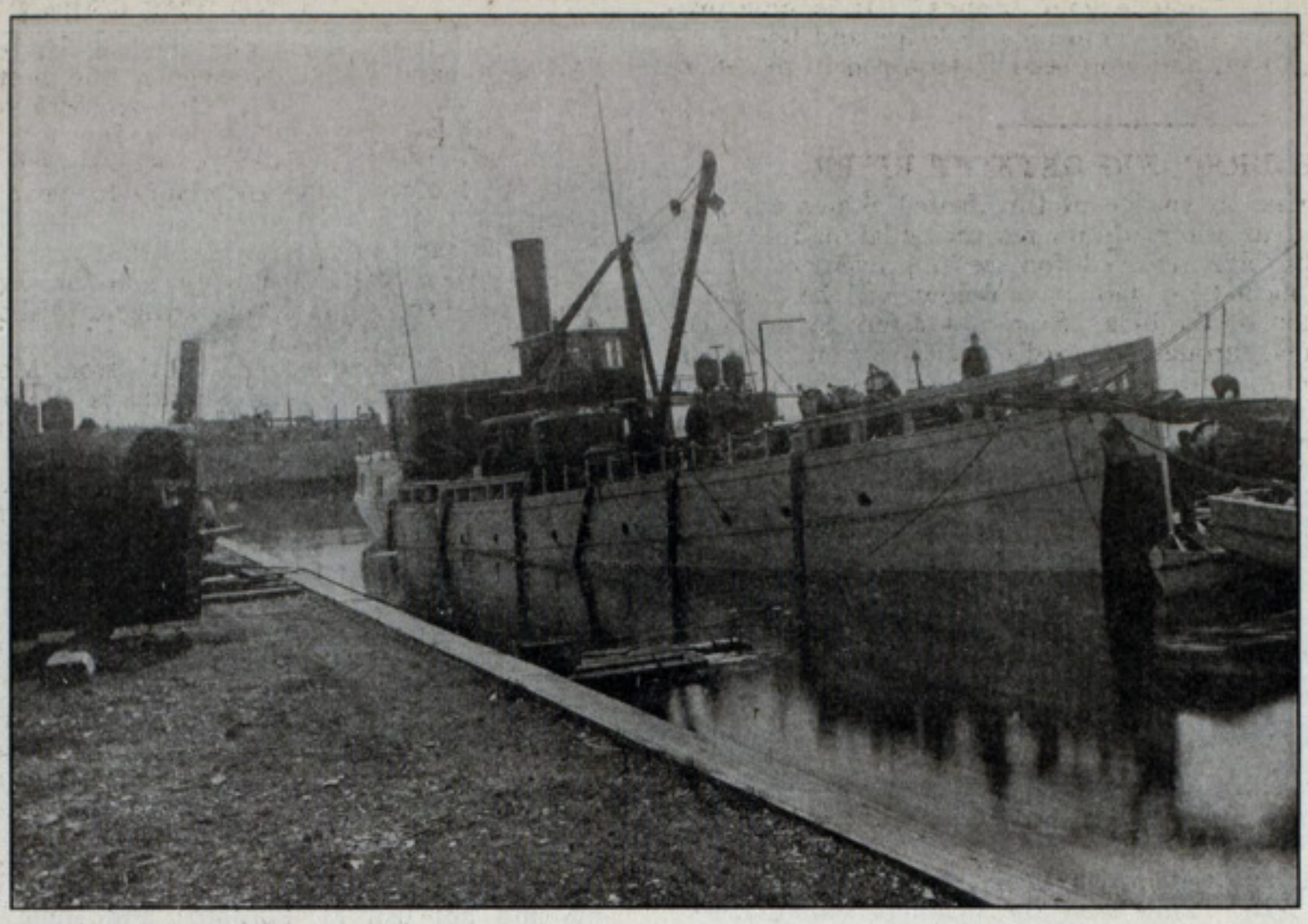
Editor Marine Review: I have been very much interested in your articles on licensed officers for small motor boats. You have taken a right stand on this question and should be sustained. If allowed to get an entering wedge, they will from year to year keep adding restrictions until the law becomes a nuisance. Our country is cursed now with too much law that is only of benefit to office seekers and a detriment to the business of the country. The steamboat law has been amended and added to until for a

man to get a license to sail or run a tug boat engine he would have to be a graduate of one of our high schools. A fireman with ten years' experience and capable of handling the machinery and doing first-class work, but without education, has no show. While before the law was changed, requiring three years' experience in fire-hole, a man with little experience but good at figures could get a license. The requirement now of education and three years' experience in fire-hole practically bars trade from new men. After a man has the education required, he will not go into a fire-hole. Your correspondent, Licensed Officer, quotes two accidents in a number of years. Let him quote the steamboat accidents in proportion to the number of motor boats and steamers and what do we find with all our laws governing them? Won't they go ten to one? I think they will. I am a machinist and licensed engineer and have run up against some of these propositions. I see he denies that licensed men are behind the bill and pushing it. I know it, however, to be a fact. Members of the Licensed Tugmen's Protective Association in this place circulated a petition urging its passage. Who will be benefited by such a law? A few office seekers and incompetent licensed men who cannot procure and hold a steamer. You say it requires less skill than to row a boat. You are right in this statement. I see the licensed officer takes exception to this. Some of the first gasoline motors turned out gave trouble, but you take an up-to-date motor of today and you are correct in your statement. It is their success and the great improvements which are being made in them that is making licensed officers fear them and causing them to push this useless legislation. I do not know of a boat in these waters throwing out gasoline motors and putting in steam; but, on the contrary, I do know of steam fish tugs contemplating throwing out steam and putting in gasoline motors.

No, we have all the law required now for handling these launches. The passage of additional laws would make an American prefer to be a Turk. They are driving capital out of business and into Mexico. As you say, Americans pride themselves on their personal liberties. Are they to be taken away from us by such useless and worthless legislation?

Yours truly, THOMAS H. SMITH.

Sturgeon Bay, Wis., Feb. 29.



No. 5. Vessel Complete with all Outfit in Place.

SEEN AND HEARD ON THE LOOKOUT.

A crowd of seamen and longshoremen interestedly watching the berthing of a large "square-rigger" alongside a New York pier recently was certainly illustrative of the decreasing frequency of the visits of such vessels. The ship in question was one whose graceful lines, abnormally long jib-boom and lofty spars unerringly proclaimed her American nationality to the most inexperienced seaman. Nothing more beautiful than this vessel, a veritable floating combination of ornamentation and usefulness, has arrived in port for many months. And thus, according to the majority of books supposedly description of "the men before the mast," the captain of this now almost unique American vessel should experience little difficulty in securing a crew. Anyone, however, conversant with the modus operandi of gathering the required number of men could furnish a synopsis of the previous chapters of each of said men's career. Or, it should be said, rather, that her crew could be divided in three classes: First, a few good "old-timers" whose disbelief in the steamboat deckhand's right to be called a sailor induces them to ship on the "wind-jammer;" second, some sailors who, though preferring a coasting schooner or a steamer, have allowed themselves to become subjects of that most autocratic of rulers —the boarding-house master; third, numerous members of the army of the submerged tenth, and to whom the intricacies of the ship's running gear are as great a mystery as are their own antecedents to the captain. Several reasons can be given for the average sailor's disinclination to ship on the three-skysail yarder. The wages paid a sailor on a square-rigger are generally much less than those received on a steamer or even a coasting schooner. The long voyage with its resulting "salt-horse" diet fails to appeal to even a far from epicurean mariner. But, enough.

Said a sailor who was leisurely contemplating the recent arrival: "That ship would be much improved by giving her double top-gallant and royal yards, and converting her skysails into bunk curtains or chafing gear." It being impossible to conceive that the suggested change would improve the ship's appearance, the sailor must be accused of selfishness for wishing to disfigure the beautiful for the sake of his own convenience. Anyhow, it is the consensus of opinion of the water-front frequenters that she is a most beautiful craft. But the comments of most sailors—I mean, of course, those who retain sufficient liberty to utter them—when requested to ship are unfit for publication. As soon as this ship has "signed" a crew I hope to give your readers a description of its members.

There arrived on our shores some time ago an Englishman. While this fact in itself may be called an every-day occurrence, this Britisher's mission is certainly novel. In short, it may be called an attempt to solve the cattlemen's problem. Every cattle steamer carries besides her regular crew a number of men who are hired to feed the live stock. Strikes often unpleasantly demonstrate the landsman's ability to safeguard his interest. There are powerful seamen's unions, helpful consuls and missionary and legal aid societies to extend a willing hand to the wronged mariner. But the cattleman is neither a landsman nor a seaman. As I heard a sailor once express himself when referring to one of these maritime cowboys: "He is neither fish, fowl, nor good red herring." As is generally the case when investigating the condition of a certain class of men the first question asked is: "What is their pay?" The answer to this question can be found in the so-called "want" columns of the larger daily papers. And herewith the ad.: "Wanted—500 men to feed cattle; $5 to England; $10 to Mediterranean ports: $15 to Africa. Free return ticket." An advertiser in a Boston paper neglected to mention any price, but, having heard that music has charms to soothe the savage breast, he concluded that humor might be sufficiently potent to "Lorelei" embryo cattlemen to his place of business. Herewith also his ad.: "Be in style and visit Europe. Free return trip and numerous labels with which to decorate your dress-suit cases. Startle your friends." The question of remuneration having now been answered, the next to be asked is: "Who are these men who so incongruously volunteer to do farm work on the ocean?" They may be classed as follows: First, seamen who have been paid off in an American port and prefer a little peasant's work to paying for their passage home; second, foreigners, generally recent arrivals, but not seamen, whose quest for the Eldorado on the American continent proved unsuccessful; third, men from nowhere in particular, who decided to transfer what little energy they possess from the railroad track to the high sea route. Upon arrival in Europe the man receives the few dollars for which he agreed to feed cattle during the trip, and a return ticket for the first steamer belonging to the same line as the boat in which he came over. If in the first or second class the man may try to sell his ticket. It is said, however, that the steamship companies have taken precautions to guard against the transferring of tickets. A cattleman belonging in the category of my third class now finds himself in a helpless situation, a strange land and a famished condition. In a few hours his pay is generally spent, and unable to secure food and shelter until his steamer's day of departure, he almost invariably selects to pay a visit to the American consul. Before a cattleboat leaves on her eastward trip, not only the cattle, but also their pens and their food are thoroughly inspected. The width of the passages between each row of stalls, for instance, is regulated by law. But no question is ever asked as to the condition of the men who are hired to look to the comfort of the cattle. It is nothing unusual for cattlemen to go on board what sailors call "schooner rigged." A "full-rigged" sailor being one who possesses a well stocked wardrobe, a simple, or a "schooner-rigged" person is one who owns nothing in the line of clothing but what he wears at the time. After feeding cattle and cleaning pens during a trip across the Atlantic the state of a schooner-rigged man's clothing upon his arrival might certainly bear out the Boston

advertiser's prediction: "Startle your friends." It is now proposed to compel the steamboat companies to lodge and board the cattlemen they bring over, and who become stranded in the effete east.

BIDS FOR DREDGING DETROIT RIVER.

Major W. L. Fisk, in charge of the United States engineer office of Detroit, has as yet made no recommendation to Washington regarding the bids received for the improvement of the Detroit river and opened on Jan. 25. Below will be found a tabulated classification of the bids. Section 1 refers to the deepening of the channel through Ballard's reef; section 2 to the widening and deepening of the channel at Lime Kiln crossing; section 4, deepening and widening the channel along Amherstburg reach and Hackett's range; section 3 and 5, widening and deepening channel along Bois Blanc island range and deepening channel through Bar point shoals.

	Section 1. 35,000 cu yds. full rate. 140,000 cu.yds. ½ rate.	Section 2. 105 000 cu.yds. full rate. 55,000 cu.yds ½ rate.	Section 3. 150,000 cu yds. full rate. 245,000 cu.yds. ½ rate.	Sections 4 and 5 825,000 cu yds. full rate. 300,000 cu.yds. ½ rate.
M. Sullivan, Detroit, Mich			2.80	
Dunbar & Sullivan Dredging Co. Buffalo		3.38		58
G. H. Breyman & Bro. Toledo, O.	6.25	3.25	4	02
W. A. McGillis & Co. Cleveland, O.	5.80	4.20	3.10	75
The L. P. & J. A. Smith Co. Cleveland, O.	5.60	4.15	3.10	50
Buffalo Dredging Co. Buffalo	5.40	3.42	3	75
Lake Erie Dredging Co. Buffalo	5.75	3.40	3	79

HARBOR OF REFUGE AT ONTONAGON.

Capt. John G. Parker, of Ontonagon, probably the oldest of the living lake captains, does not agree with Capt. D. D. Gaillard that a harbor of refuge at Ontonagon is not necessary. Capt. Gaillard, in his report, gave it as his opinion that Ontonagon does not possess marked advantages over existing harbors of refuge for vessels passing around Devil's island, and that at the present time no further improvements are necessary for Ontonagon harbor. Capt. Parker differs with this opinion. Capt. Parker's opinions are based upon an experience of over 50 years in lake navigation. He says:

"I agree with Capt. Gaillard when he says improvements are not necessary for the business now at Ontonagon; but I think that it could be made a good harbor of refuge by building about 1,500 ft. of pier for breakwater. Say commence 500 ft. from the end of the west pier and run it out in the lake about west by north. Then extend the east pier 500 ft. to cover the entrance. When a vessel bound down is off Ontonagon and meets with a northeaster, rather than run back to the islands she would come in the Ontonagon river. Or when a vessel bound up and is off Ontonagon meets with northwester she would bear up for Ontonagon rather than run back to the canal if there were a good harbor to get into. That is what I would do. I have navigated Lake Superior on sail and steam vessels for about thirty years. Have run back from off Ontonagon to Point Keweenaw when bound up and to La Point when bound down, a great many times. And hundreds of others have done the same thing. Had there been a good harbor at Ontonagon a great many lives and dollars would have been saved. I would like to have had Capt. Gaillard with me on some of my trips running from Ontonagon when a lea had to be made in a gale of wind or blinding snow-storm. With such an experience I think that he would be anxious to do all he could toward securing a harbor of refuge at Ontonagon. There was not a light-house on Lake Superior when I commenced sailing in 1846."

EDWARD SMITH RETIRES FROM BROWN & CO.

Editor Marine Review:—Having accepted the presidency of the Great Lakes Towing Co. and having entered upon the duties of the office, which will take all of my time, I have withdrawn from the firm of Brown & Co. after an association with my partners Mr. J. J. H. Brown and Mr. J. B. Rodgers of twenty years. Although I have withdrawn from the business entirely, and will have no connection or money interest in it, I have the greatest friendliness for my former partners, and am solicitous for their welfare and continued prosperity of the business, and therefore trust that my special friends among the customers of the firm may continue to patronize the firm of Brown & Co, and I know that the interests of the vessel owners represented by them will continue to be served in the same way that they always have been.

Sincerely yours,

EDWARD SMITH.

The business of the firm will be continued by J. J. H. Brown and J. B. Rodgers under the same name of Brown & Co. at No. 86 Dun building, Buffalo, N. Y.

AROUND THE GREAT LAKES.

Capt. John H. Langley died at St. Joseph, Mich., last week. He commanded the Messenger, the first vessel owned by the Graham & Morton Line. He was sixty years old.

The Detroit river is now free of ice from Belle isle to Sandwich point, and the car boats of all the railroads are making the most of the opportunity to clean up the freight congestion.

The car ferry Santa Marie lost one of her iron plates in the ice between Mackinaw City and St. Ignace last week. This makes the second time this winter that she has met with the same mishap.

A report has reached Duluth from Montreal to the effect that Capt. A. B. Wolvin, of Duluth, is discussing with the government of Mexico a proposed steamship line to operate between Mexican and Canadian ports.

When car ferry Pere Marquette No. 19 was docked at Milwaukee last week, after having been on the rocks at Fox Point for several days, it was found that her injuries were very slight. Several plates will have to be replaced.

Capt. Duncan Nicholson has been appointed superintendent of the fleet of the Detroit, Belle Isle & Windsor Ferry Co., to succeed the late Capt. Albert Clinton. Capt. Nicholson is one of the best known captains on the lake.

It is reported that 3,000 freight cars are standing on the Wabash tracks waiting for the ice to get out of the Detroit river. Some of the cars have been sent to Port Huron and through the tunnel subject to the consent of the Grand Trunk railway.

Mr. Joseph F. Hayes, of Duluth, formerly chief engineer of the fleet of the Pittsburg Steamship Co., is now in New York superintending the laying of the American ocean steamships Minnewaska and Minnetonka. Lack of business has caused the laying up of these steamers.

With four of its steamers disabled by the ice, the Detroit, Belle Isle & Windsor Ferry Co. was compelled to entirely suspend service between Detroit and Windsor. It is upwards of a quarter of a century since the ferry company was forced to avoid entirely its route from Woodward avenue to Windsor.

Contract has been let by the Lehigh Valley Coal Co. to Campbell & Co. of Duluth for repairs to a dock at the foot of Tower bay slip, Duluth. The purpose is to increase the storage capacity of the dock. The demand for coal in the northwest has increased so rapidly that the company is in need of additional facilities.

Operations at the Manitowoc dry docks have been suspended because of a strike of the union employes. They demand 27½ cents per hour for nine hours' work instead of the former rate of 25 cents an hour for a ten-hour day. The demand for higher wages comes just at the time when the managers of the ship yard were about to announce a cut. They say that in order to continue work at the ship yard with the small amount of business to be had the men will have to submit to a reduction, instead of asking for more.

Bids for a tender for use in reconstructing the Spectacle reef light crib were opened at the office of Major Lansing H. Beach, lighthouse engineer for the eleventh district at Detroit, last week. Capt. J. W. Westcott was the lowest bidder, offering either the steamer Myrtle M. Ross or the Mary Groh at $20 per day. Capt. James Shackett offered the steamer Faustin for $24.55 per day. The highest bid was from the Vulcan Transit Co., for the steamer Forest City at $42.68 per day. An examination of the vessels will be made before a bid is accepted.

The side wheel steamer City of Buffalo of the Cleveland & Buffalo Transit Co.'s fleet, will be in readiness by the opening of the season of navigation. It required just fifty days to saw her in two, pull her apart and build up a new section 42 ft. 9 in. long amidships. She was widened 2 ft. below the water line in order to insure her stability and buoyancy for her added length. Her capacity has been increased about 60 per cent. All that now remains to be done upon the steamer is to readjust some of her minor machinery and construct new cabins in the new section.

The steamer building at the Cleveland yard of the American Ship Building Co., for Capt. Chas Hutchinson and others of Cleveland, will be named Martin Mullen. The steamer building at Cleveland for the Columbia Steamship Co. will be named Francis Widler. Both of these vessels are duplicates. They are 436 ft. over all, 416 ft. keel; 50 ft. beam and 28 ft. deep. They will be equipped with triple-expansion engines with cylinders 22, 35 and 58 in. in diameter by 40 in. stroke. Steam will be supplied by two Scotch boilers, fitted with Ellis & Eaves draft. Capt. Wm. P. Benham will command the steamer Martin Mullen when she goes into commission.

Major James G. Warren, in charge of the ninth lighthouse district, with headquarters at Milwaukee, will hold an examination for the purpose of perfecting an eligible list to select from in case vacancies occur during the coming year for the positions of master, mate, second mate, engineer and assistant engineer of the lighthouse tender Hyacinth; and also for the positions of superintendents in the lighthouse service in his district. One superintendent will require a machinist who understands the construction and repairs of boilers and machinery. The other superintendent will require a general knowledge of building construction, qualities of material and ability to handle working force. Application may be made either in person or by mail during the next thirty days.

TEST OF BATTLESHIP'S TURRETS.

In spite of the secrecy surrounding the tests of the turrets of the French battleship Suffren by firing heavy projectiles against it data concerning the firing have become available and experts have been able to arrive at some interesting conclusions which will be of use to the world's navies. It is a remarkable fact that the civilian minister of marine should be the first to attempt a practical solution of the question as to whether the present armored turrets of battleships would or would not suffer seriously from the shock of projectiles striking them. Up to the present time it has been the custom in all navies to limit the test to determining the degree of resistance of the armor plates which are to compose the turrets, and not to submit the entire turret, mounted and in position, to a firing test, as was done in this case. It was therefore impossible to determine with any certainty, under the old method, whether the rotating mechanism of the turrets of the types tested would function properly or not after having been hit by one or more projectiles.

However, turrets designed for fortification works on shore (like the so-called Gruson turrets with rounded top) had been submitted to trial as a whole by firing not only on the separate parts, but also on the completed structure, and then firing from the guns enclosed in these turrets to determine the effect of the previous firing on the turret as to accuracy of fire of the guns mounted in them, as well as the rotating power of the turrets themselves. A number of such tests have been made and gave very satisfactory results.

There is, consequently, no difficulty whatever in constructing turrets (cupolas) which will resist armor-piercing shells of 6-in. or explosive shell of 9½-in. caliber, five calibers long, and these turrets after having been hit a number of times, could still turn without any difficulty and would still admit of accurate fire from the enclosed guns.

These trials proved that when the exposed surfaces of armor plate were inclined about 45 degrees to the line of fire it was sufficient to have the weight of the rotating mass of the turret approximately 250 times the weight of the projectile, in order that, even after having been hit fifty times by 6-in. steel projectiles, neither the facility of rotation nor the accuracy of fire from the turret guns shall suffer in the least. But the turrets of warships had never been submitted to tests of this kind. It was usually deemed sufficient to test the separate plates of which the turret was to be composed, and if these resisted several shots it was concluded that the turret would offer the necessary resistance.

Modern ships' turrets are cylindrical, with the exposed face slightly inclined. With such turrets the factor 250 given above as sufficient for the weight of armored turrets of land forts is not sufficient. Since the energy of the projectile increases with the square of the sine of the angle of impact, and since ships' guns nowadays have very high muzzle velocities, it is necessary to adopt for armored ships' turrets a weight 700 times that of the projectiles striking them.

The firing against the Suffren was directed against a cylindrical turret armed with two guns. The turret was constructed of steel plates nearly 12 in. thick, the diameter of the turret being about 26 ft. and its height about 8 ft. Its weight, including the two guns was therefore about 440,000 lbs. The projectile fired against it was a steel 12-in. shot, weighing about 642½ lbs.; hence the turret weighed approximately 700 times the weight of the projectile. According to the published reports the rotating mechanism suffered in no wise from the shock of the projectiles. Pieces of armor were thrown to right and to left, but these only affected the protecting plates used to cover the turret and prevent penetration into the latter. As the weight of the protecting plates was only 1½ per cent. of the total weight of the turret, it did not affect the result.

Therefore the test may be regarded as absolutely conclusive, and to M. Pelletan, the French minister, is due the credit of having thus elucidated in a radical way a most important question, and one never examined into before. Moreover, the French navy was thus able to prove (contrary to the doubts which had frequently been expressed) that it could count absolutely on the resisting power of its armored turrets in actual war.

But it is very doubtful if this is true of the turrets of more recent construction, in which nickel steel, surface hardened, is used. Because of the greater resisting power of this metal, the thickness of the armor plates has been reduced nearly one-half. Were the turret of the Suffren, for example, made of nickel steel only 6 in. thick, it would not be perforated, to be sure, but it is doubtful whether the rotating parts, when reduced 154,000 lbs. in weight, and weighing therefore only 286,000 lbs., could stand the shock of the projectile without causing the gun carriages and the rotating mechanism to suffer, since its mass would now represent only 400 times the weight of the projectile. A projectile of 642½ lbs. weight striking with a velocity of 1,640 ft.-seconds would impart a velocity of nearly four ft.-seconds to the mass of such a turret supposedly suspended like a pendulum.

It is therefore dangerous to carry too far the tendency to reduce to a minimum the weight of the armor plates with a view to reducing the weight of the ship as much as possible. Ship constructors will thereby produce turrets which will resist perforation by projectiles, to be sure, but which will be in danger of having their rotating mechanism put out of action from the shock of projectiles on the too light turrets.

Under certain circumstances a heavier turret formed of thicker armor of lower quality will be better than a turret of lighter and better material, because the greater mass of the former will give the whole a greater rigidity. Again, since the armor of better quality—chrome nickel steel, for example—is much more expensive, it may often be advantageous to use the cheaper material in the interior, and the better material on the exterior. But the most rational solution appears to be to construct these armored turrets by casting them in chrome nickel steel, either in the ordinary way or by hardening the surface. In Austria armored cupolas have been cast in this way since 1886, under the direction of Col. Tilschkert, a high authority in the Austrian army, and about nine years ago he proposed to harden the surface of these cupolas by casting them either in water or in oil; but this process was never applied, because the resistance of the cupolas cast in the ordinary way and not hardened was found ample.

In 1902, however, Krupp exhibited at the Düsselsdorf exposition cast armor plates of chrome nickel steel, and proved to the world that these plates simply cooled have a resistance nearly equal to forged and laminated plates. The cost of the latter, on account of the difficulty of obtaining the desired curvature, is far greater than that of the former; moreover, the turret in the former can be given a spherical form, so that the projectiles will always strike it at an acute angle, that is, with only about half the energy they strike a cylindrical turret. At the same cost, therefore, turrets are obtainable which are more massive (and consequently more stable), and since the projectiles strike only obliquely the same thickness is not required as in cylindrical turrets. Instead of a weight of turret 700 times that of the projectile, one 400 times this weight will suffice; and this weight may even be considerably less, since a weight 250 times that of the projectile has been found sufficient for turrets of land forts. The naval turret of cupola (hemispherical) form appears therefore to be the most sensible. A cylindrical turret of 440,000 lbs weight, of nickel steel hardened, costs about $96,000, without cost of foundation or cost of placing in position, while a turret of cupola (hemispherical) form, cast and hardened, without the addition of nickel, and of just as great resisting power, though weighing only 264,000 lbs., costs only $24,000, or about one-fourth as much.

ALL THE WIND IN THE WORLD STOPPED BLOWING.

There entered the port of New York last week, the four-masted bark Juteopolis, five months overdue from Iloilo. As a rule when a vessel is much belated it is usually due to storms, broken gear and days upon days of fighting with the elements. But Captain Thomas Curd of the Juteopolis has another story to tell. The Juteopolis's buoyance was of such peace and calmness that the skipper at once despaired of ever seeing land again. Week after week she dawdled about in the north Pacific, illustrating very well the lines of Coleridge's celebrated poem "The Ancient Mariner:"

Day after day, day after day
  There was no sound or motion
As idle as a painted ship
  Upon a painted ocean.

The Juteopolis turned practically on her heels, making far more leeway than headway whenever the wind blew enough to fill her sails. There was never a blow from the time she left the Philippines until she got off Hatteras. The vessel was consigned to Phillip Ruprucht, manager in the foreign shipping department of the Standard Oil Co. Relating his experiences the captain said:

"I'll give you my word, I never expected to be able to get the ship out of the calm we encountered south of the Caroline islands. We stood about the islands for two whole months, with just about enough wind coming out of the sky to fill a lady's pocket handkerchief." He ran his hand through his towering mass of iron-gray hair and smiled. "And that wasn't the worst of it. We beat about a little island in the north Pacific for twelve days and watched the canoes of the natives, and they're all savages down there—try to come out to us. I suppose we'd have been murdered if they'd ever got aboard, but they seemed unwilling to make the move. I watched them through the glass for more than a week, and wondered when they'd get together in force enough to try boarding. But, to begin at the beginning, we sailed from Iloilo on April 30 with a full cargo of sugar. There was a south wind blowing, and I found that it was best to make a run through the Bashee channel, which is to the north of Luzon. It was only a light wind, and bless you, we didn't have anything but light winds from the time we weighed anchor, so we took a long time to make the channel. After we got through we made to the eastward, but the wind was such that I couldn't go north about, and had to tack to the south and east. Then we settled the ship down to a southeast course, to pass to the south of the Caroline islands. I expected to be able to get into the path of the southwest monsoons, which always blow in every other part of the equator at that season. I found my Pacific directory advised that ships could make a passage west if they should keep between 4 and 8 degrees north of the line.

"Up to this time the voyage had been slow enough so I was full of hope of making a good run with the monsoon. But when I got south of the Caroline islands all the wind in the world stopped blowing. Of course, there was a puff now and then, but

it only lasted long enough to encourage us; while we were thinking about it, it fell away to dead calm. The log has them down as 'light airs,' and they were just about the lightest you ever felt. They wouldn't have blown a match out. It was simply a case of lying practically idle day after day on a sea like a bathtub full of water, wondering where the next puff would come from, and knowing it wouldn't be anything more than a puff. In these light airs the ship moved a few feet an hour either ahead or abeam, and we stood about the decks, and watched the sails flap. As I have said, I didn't see any reason why we wouldn't have to stay right there for the rest of our lives. There wasn't anything to do except walk up and down and wonder where the wind had gone. For two blessed months we sailed about over a few miles of water, never doing much more than a discouraging fraction of a knot an hour, and all the time eating up our stores and drinking our water. But a suggestion of a north breeze managed to arise, and I set the ship's head south, thinking I'd go through the Solomon Islands. But the breeze only enabled us to make one mile ahead, and two miles to leeward, which wasn't at all what I wanted. After a while we got going due west, just the opposite direction we wished to go, and the upshot of the thing was that we headed the Juteopolis to the northward, and went through the Caroline Islands as the best thing to do. When we reached 10 degrees north we encountered the island with the savages, and for twelve days we played about that island. We sailed around and around it, and the canoe men probably were very sanguine that we'd stay there long enough to make meat for them, but luck came to us at last, and we made the northeast trades. However, we couldn't make an easting until we reached 38 degrees north. Then it was clear that we did not have enough food aboard to take us around the Horn, so it became necessary to set a course for Honolulu."

OUR TRADE WITH THE ORIENT.

The value of the commerce of the countries fronting upon the scene of hostilities in the orient aggregates about $600,000,000 per annum, and the value of the commerce of the United States with those countries aggregates over $100,000,000 per annum. While the prospect of war resulted in the placing in the United States of orders from Japan for flour and from Russia for meats, the general trend of exportation to the four countries fronting upon the scene of hostilities has been downward during the period in which this subject has been actively discussed. To Japan the exports from the United States during the month of December, 1903, were $2,263,245 in value, against $2,811,589 in December of the preceding year, and for the entire calendar year 1903 were about $1,000,000 less than in the preceding year. To Asiatic Russia the exports from the United States were $716,274 in 1903, against $898,711 in 1902 and $1,013,320 in 1901. To China our exports during 1903 were materially below those of the preceding year, being for the month of December $841,373, against $1,857,733 in December, 1902, and for the entire year $14,970,138, against $22,698,282 in 1902. This reduction occurs chiefly in cotton cloths, of which our total exportation to China in December, 1903, was but 3,665,364 yards, against 20,582,544 yards in December of the preceding year, the value being $230,546 in December, 1903, against $1,074,463 in December, 1902. For the entire year the value of the cotton cloth exported from the United States to China was $8,801,964, against $16,048,455 in the calendar year 1902. This reduction in exports to China is not peculiar to the United States, as the official reports of the Chinese government show a general reduction in its imports during the past year, up to the latest period covered by the reports.

To Russian China our exports show an increase, being in 1903 $846,310, against $421,163 in 1902. To Korea the exports of the year also show a slight increase, being valued at $370,566 in 1903, against $257,130 in 1902. To Hong Kong, which is sufficiently far removed from the scene of existing disturbances to be less affected, apparently, by such conditions, the exports from the United States show an increase, being in December, 1903, $1,705,436, against $1,417,736 in December of the preceding year, and for the entire year $9,792,193, against $8,751,779 in 1902.

As to the trade of the United States with Manchuria, it is not separately shown in the general statements of the commerce with China. The department of commerce and labor, through its bureau of statistics, however, has recently compiled some figures which show that the imports to Newchwang, the principal port through which Manchurian commerce now passes, amounted in 1902 to about 18,000,000 haikwan taels, against 17,000,000 in 1901 and 8,000,000 in 1900. The value of the haikwan tael in 1902 was 63 cents, so that the value of the imports of Manchuria, stated in dollars, would be, in 1902, about $11,000,000. The official report of the Chinese government does not specify all classes of merchandise received into Newchwang from the United States, but does specify the four principal articles—American jeans, drills, sheetings and kerosenes. The total value of these four articles of American production reported as brought into Newchwang in 1902, either coming direct from the United States or from other ports of China, was 6,118,920 haikwan taels, which at the official valuation of the haikwan tael in 1902 would make the total value in United States currency $3,854,920.

The table which follows shows the value of American jeans, drills, sheetings, and kerosene imported into Newchwang direct from foreign countries and from other ports of China from 1896 to 1902:

VALUE OF AMERICAN JEANS, DRILLS, SHEETINGS, AND KEROSENE OIL IMPORTED INTO NEWCHWANG FROM FOREIGN COUNTRIES AND FROM OTHER PARTS OF CHINA, 1896 TO 1902.

	Haikwan taels.
1896	2,249,876
1897	3,426,238
1898	3,665,257
1899	6,359,154
1900	2,213,588
1901	6,195,146
1902	6,118,883

From the above table it will be seen that the value of these four American articles imported into Newchwang has remained stationary during the past two years, after having recovered from the great reduction noted in the figures of 1900. Stated in the order of their relative magnitude in the imports into Newchwang during 1902, American sheetings occupy first place, their total value being 4,360,608 haikwan taels; American drills hold second place, 1,382,020 haikwan taels; followed by American jeans, 257,670 haikwan taels; flour, 135,389 haikwan taels; and American kerosene, 118,585 haikwan taels.

The table which follows shows the total value of foreign merchandise of all kinds imported into Newchwang in each year from 1896 to 1902:

TOTAL VALUE OF IMPORTS OF FOREIGN MERCHANDISE INTO NEWCHWANG FROM FOREIGN COUNTRIES AND FROM NATIVE PORTS, RESPECTIVELY, 1896-1902.

Year.	From foreign countries. Haikwan taels *a*	Foreign goods from native ports. Haikwan taels *a*
1896	1,886,485	6,271,166
1897	1,641,415	7,417,236
1898	1,453,318	9,174,245
1899	5,279,185	16,566,413
1900	2,682,420	5,488,632
1901	4,293,737	12,854,552
1902	5,346,306	12,969,264

a Average value of haikwan tael reported by Chinese Government: 1896, 81 cents; 1898, 70 cents: 1901, 72 cents; 1902, 63 cents.

The table which follows, presented by the department of commerce and labor, through its bureau of statistics, shows the value of the imports into Japan and those from the United States and the United Kingdom, respectively, in each year from 1881 to 1903, and the percentage which each of those countries supplied of the total imports into Japan:

TOTAL IMPORTS OF JAPAN AND SHARE OF THE UNITED STATES AND UNITED KINGDOM THEREIN, 1881 TO 1903.

(Compiled from official reports of the Japanese Government)

Calendar Year.	Total.	From United States.		From United Kingdom.	
		Value.	Per cent.	Value.	Per cent.
	Yen.	*Yen.*		*Yen.*	
1881	31,128,125	1,781,108	5.72	16,364,740	52.57
1882	29,441,453	3,106,758	10.55	13,956,048	47.40
1883	28,431,939	3,187,114	11.21	12,744,948	44.83
1884	29,626,781	2,489,969	8.40	12,758,806	43.07
1885	29,356,967	2,751,320	9.37	12,456,610	42.43
1886	32,168,432	3,358,986	10.44	12,703,248	39.49
1887	44,304,251	3,309,269	7.47	18,970,544	42.82
1888	65,455,234	5,673,843	8.36	28,693,567	43.81
1889	63,995,009	6,173,141	9.65	26,067,934	40.73
1890	80,554,874	6,900,190	8.56	26,619,102	33.04
1891	61,969,183	6,840,047	11.04	19,996,050	32.27
1892	70,076,410	5,988,053	8.54	20,789,332	29.67
1893	87,597,095	6,090,408	6.95	27,929,628	31.88
1894	116,284,050	10,982,558	9.44	42,189,873	36.29
1895	127,260,844	9,276,360	7.29	45,172,110	35.49
1896	169,882,595	16,373,419	9.64	56,251,780	34.88
1897	218,440,623	27,030,537	12.38	65,406,266	29.94
1898	274,599,260	40,001,097	14.57	62,707,572	22.84
1899	219,228,647	38,215,894	17.43	44,836,994	20.45
1900	286,170,933	62,761,196	21.96	71,638,220	25.03
1901	255,816,644	42,769,429	17.5	50,575,788	19.8
1902	271,731,258	48,652,824	17.9	50,364,029	18.5
1903*a*	311,000,000	45,000,000	14.2	48,500,000	15.6

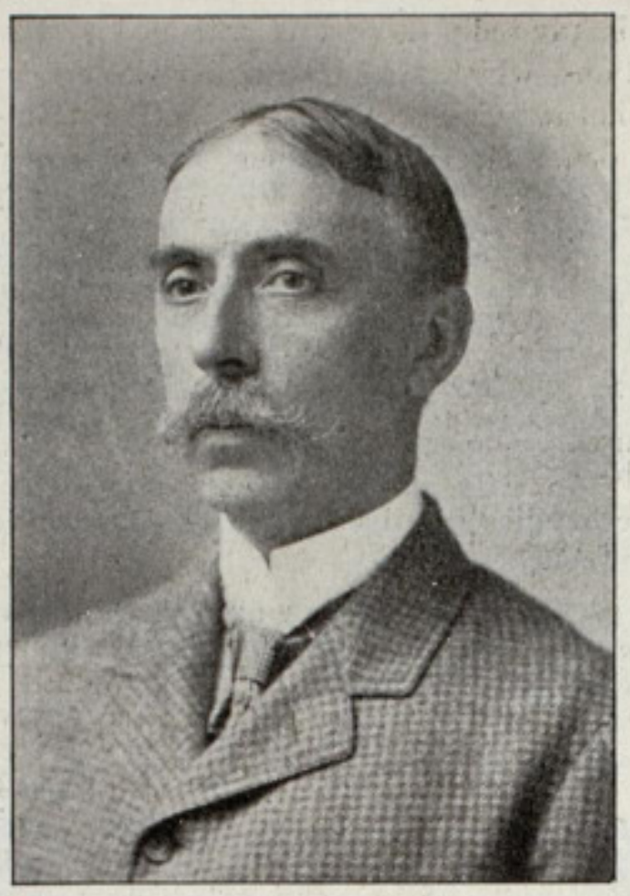
a Actual figures for eleven months and estimate for December.

The battleship Virginia building at the yard of the Newport News Co. will be launched April 5. Mr. C. B. Orcutt, president of the company, called upon President Roosevelt this week and invited him to be present. At the request of the secretary of the navy, President Orcutt has invited Miss Matilda G. Montague, daughter of the governor of Virginia, to act as sponsor, and she has consented to name the vessel.

The new steamer building at the yard of the New York Ship Building Co., Camden, N. J., for the Merchants & Miners' Transportation Co. of Baltimore, is being rushed to completion and it is expected will be ready for service by June. She is 315 ft. long and 42 ft. beam, constructed of steel throughout and equipped with the most improved devices for the rapid handling of cargo. She will be named Ontario.

ERIE CANAL ADVISORY COMMISSION.

As announced in the last issue of the Review, Gov. Odell of New York has appointed a special advisory committee of five expert engineers, under whose supervision the work of enlarging the Erie canal, to accommodate barges of 1,000 tons capacity, will be built. State Engineer Bond will himself be the chairman of this commission and will resign his office to accept the position. The other members of the commission are Col. Thos. W. Symons, United States engineer-in-chief of public buildings at Washington, Alfred Brooks Fry, in charge of United States buildings at the port of New York, Dr. Elmer L. Corthell, a noted engineer engaged in construction work and Wm. A. Brackenridge, engineer in charge of the Niagara Falls Power Co. The salaries of these men have been fixed at $7,500 per annum each, and they will undertake their duties at once. The barge canal act which was passed at last year's session of the New York legislature and ratified by the people at the polls in November last, gives to the commission a general advisory function with reference to the work. They are to follow its progress and report to the governor, to the state engineer, and to the state canal board any changes or modifications in the plans, which they may desire to recommend, but they will have no authority to compel such modification. It is the governor's desire that the personnel of the commission shall not be changed during the progress of the work, which is expected to occupy from seven to ten years. It is a little unfortunate that this commission, which is really an excellent one throughout, has not charge of the actual construction of the canal. However, they will undoubtedly operate as a force tending to integrity and conservatism.



Col. Thomas W. Symons.

Mr. Edward Austin Bond, the chairman of the commission was born at Dexter, Mich., on April 22, 1849, his ancestors on both sides being among the early settlers of this country, being about 1650.

Mr. Bond received his education in the public schools of Cass county, Michigan, and the business college of Utica, N. Y. His first engineering work was for the Delaware, Lackawanna & Western railroad from 1867 to 1870, when he was appointed an assistant engineer of the Utica and Black river railroad, which position he held until 1875, when he was appointed chief engineer having charge of the construction of the roads from Lowville to Clayton and Ogdensburg, N. Y. He continued as chief engineer of the Utica and Black river railroad until 1886 when he became chief engineer and general superintendent of the Carthage & Adirondack railroad from Carthage to Benson Mines and the Oswegatchie river, this being one of the earliest roads which penetrated the great Adirondack region. In 1889 he resigned his position to become a member of the firm of Hinds & Bond of Watertown, N. Y., which did a general engineering and contracting business in railroad work and the construction and operation of waterworks in the United States and Canada. In 1898 he was elected on the Republican ticket as state engineer and surveyor of the state of New York for a term of two years and was re-elected in November, 1900, and again re-elected in November, 1902, for his third consecutive term, being the first state engineer and surveyor in New York state who has been thus honored. In addition to his duties as state engineer and surveyor Mr. Bond has been during his term of office a commissioner of the land office, a member of the canal board, the board of state canvassers, the state board of equalization of assessments and prior to their reformation was a member for several years of the state Board of Health and Forest Preserve Board to which latter he was appointed in 1899 by Gov. Roosevelt and as a member of which he rendered active service in the preservation of the forest and water supply of the state. The improvement of public highways by means of state aid, which was inaugurated in 1898, has, during his administration of the department been brought to an assured success and has become one of the most important features of public works in the state of New York.

Mr. William A. Brackenridge.

During the first four years of Mr. Bond's incumbency of office the subject of this radical enlargement of the canals of the state to connect Lake Erie at Buffalo and Lake Ontario at Oswego with tide water in the Hudson at Troy, required his serious consideration, and by direction of the legislature he conducted surveys and prepared an elaborate report of such permanent value that it has formed the basis of all subsequent legislation for canal enlargement.

Lieut. Comd'r Alfred B. Fry.

Col. Thomas W. Symons is probably better known than any other one man in the country in association with the canal work. He was connected with the Deep Waterways commission and was a member of the Greene commission, which first reported in favor of the barge project. The report prepared by this commission, and undoubtedly dictated largely by Col. Symons, is regarded as a classic on the subject of canals. He is very well known throughout the lake region, having been in charge of the great construction works for the improvement of the harbor of Buffalo for several years.

Mr. Wm. A. Brackenridge began the practice of civil engineering on surveys and construction of elevated railroads in New York city in 1877. From 1880 to 1882 he was resident engineer of the Lackawanna railroad, engaged on surveys and construction of the main line from Binghamton to Buffalo. The next four years he was engaged in making preliminary surveys for the proposed Hartford & Harlem railroad from New York city to New Britain, Conn., which was not built, and as principal assistant engineer of the Brooklyn elevated railroad in charge of all surveys and construction. From 1885 to 1889 he was principal assistant engineer of the Long Island railroad, designed and had direct charge of all surveys for the proposed underground and elevated railway in connection with this railroad. He had also charge of the construction of docks and ferry slips. In the latter part of 1889 he investigated the principal engineering works in England, and hydraulic works in France, Germany and Switzerland. From 1891 to 1893 he was continuously employed by the Niagara Falls Power Co. and allied companies. During this engagement he made surveys of all the company's lands, including surveys of land under water granted by the state of New York, and planned and directed the execution of work in connection with the abatement of floods of the lands of the Niagara Development Co., and superintended the construction of the industrial village of Echota, including its sewer systems of drainage, street paving and building of houses. During the past eight years he has been the engineer in charge of the construction work of the Niagara Falls Power Co., including the extension of the main tunnel and the building of new power houses. He has also acted as consulting engineer for various water power companies.

Mr. Alfred Brooks Fry was born in New York City March 3, 1860. He is a son of Maj. Thomas William Gardiner Fry, who died of wounds received in the civil war. He is a great grandson of Capt. Benjamin Fry of the Fourth Rhode Island infantry in the revolution. He was educated at Morse's and other private schools and entered the engineering course at Columbia college in 1877, but went to sea before he had finished his collegiate course. He served as rodman and draftsman from 1877 to 1879, and as machinist, marine and stationary engineer from 1879 to 1886. He has been assistant engineer and chief engineer under the United States treasury department from 1886 until the present time. He is now on duty as chief engineer and superintendent of United States public buildings and of engineering work under the department of commerce and labor at the port of New York. He has served as an engineer in naval militia since its formation in 1892, and is at present chief of the staff of naval militia in the state of New York and aid-de-camp to the government, with rank as lieutenant commander. He served in the United States navy as a past assistant and as chief engineer in Cuban water during the Spanish-American war. He has also served as consulting,

civil and mechanical engineer for some of the largest corporations in the eastern states. He is a member of a great many clubs and technical societies.

Dr. Elmer E. Corthell was born at South Abington, Mass. in 1840. He spent two years in Brown university, but at the outbreak of the civil war joined the federal forces and served for four years in Virginia and North Carolina. He then returned to college and graduated in 1867. In 1868 he was assistant engineer in charge of construction of the Hannibal & Maples railroad in Illinois. In 1870 he built the bridge over the Mississippi river at Hannibal, Mo., and as a result of this was employed to build the bridge over the Mississippi at Louisiana for the Chicago and Alton railroad, with a draw 440 ft. long—the longest in the world at that time. In 1874, when the late Mr. James B. Eads was urging congress to give him a contract for improving the southwest pass of the Mississippi river by means of jetties, he requested Mr. Corthell to give his views on this important question, which had elicited a very spirited discussion as to the relative merits of canals and jetties. When the contract had been obtained, he was invited by Mr. Eads to take charge of the engineering and construction of the jetties and was engaged in this work until 1880. He spent the winter of 1880 in Mexico making surveys for a ship railway. He then undertook, as chief engineer, the construction of the New York, West Shore & Buffalo Line. From 1885 to 1887 he acted as chief engineer of the extensive surveys of the isthmus of Tehauntepec for a ship railway. He seems to have become greatly wrapped up in this project, for he wrote several addresses upon it and published several pamphlets. Since 1888 he has continued in professional work as a consulting and constructing engineer, and has done much important work along this line. He was also instrumental in giving to the world's fair at Chicago the magnificent transportation system from the heart of the city, which contributed so much to the exposition. His ability as engineer has on several occasions been solicited in work having to do with the development of waterways. At one time he made a thorough personal examination between the great lakes and Quebec in relation to a waterway from Chicago to the seaboard, and it is not surprising that the president should have selected him for service upon this important advisory commission.

President Roosevelt has sent to the senate the nomination of seven men to constitute the Isthmian canal commission, which will supervise the construction of the Panama canal. The members are: Rear-Admiral John G. Walker, chairman; Maj. Gen. George W. Davis, retired; William H. Burr, New York; Benjamin M. Harrod, New Orleans; Carl Ewald Grunsky of San Francisco and Frank J. Hecker of Michigan. The nominations have been referred to the committee on oceanic canals.

THE SPORTSMEN'S SHOW.

The tenth annual sportsmen's show opened at Madison square garden, New York city, on Friday evening, Feb. 19 and will close Saturday evening March 5. To say that the attractions, both entertaining and instructive, presented in this year's exhibition are far in advance of previous ones is putting it mildly, I speak advisedly as I have attended several of these annual exhibitions, which are given under the auspices of the Sportsmen's Exhibition Co., the present officers being Samuel W. Taylor, president; Harry C. Palmer, vice president and J. A. H. Dressel, secretary and treasurer, and it is but a small measure of praise to accord to the genius of these gentlemen, for organization and the art of entertaining, the great success of the present show, as fully attested by the increased attendance over that of former years, and the words of enthusiastic commendation one hears from those who have attended the exhibition.

The management of the show this year inaugurated a new feature—I should say an entirely new feature, for new features in the exhibition are abundant—this was a dinner given to exhibitors and invited guests after the opening of the exhibition at which Samuel Walter Taylor, editor of the "Rider and Driver and Outdoor Sport" and president of The Sportsmen's Exhibition Co. was toastmaster and Hon. Timothy Woodruff; Dr. Robt. J. Morris; John G. Amory; Buffalo Jones, warden of Yellowstone National Park; Dr. McClelland of Brooklyn; Dr. Tuttle of the Camp Fire Club and Dr. J. H. Girdner, were the principal after-dinner speakers. As one enters the garden from the Madison ave. entrance a veritable scene of enchantment is presented to view. In the center of the vast auditorium nestles a lake bearing on its bosom numberless craft designed for the sportsman, pleasure seeker and for ordinary every-day use, varying from an Indian canoe to the latest style of French and American automobile boat or launch.

The boat and launch builders represented are to be congratulated on having secured space in which to show their wares, as here they are enabled to display their craft in actual operation. Among the exhibitors of boats I would mention among a dozen or more the Gas Engine & Power Co. and Chas. L. Seabury & Co., New York; the Standard Motor Construction Co., Jersey City, N. J.; Smith & Mabley, New York; Newburg & Dunham, New York for Western Launch & Eng. Wks., Mishawaka, Ind.

The present show undoubtedly demonstrates the fact that the sportsmen's show is a fixture, and will be looked forward to from year to year with increasing interest by all who wish to be educated in things sportsmanlike, or entertained.

GEO. W. RAMAGE.

THE NAVIES OF THE WORLD.

The navies of the principal nations of the world at present line up as follows:

	Tonnage.	Men and Officers.
Great Britain	1,516,040	131,010
France	576,108	53,037
Russia (less losses)	416,158	55,208
Germany	387,874	37,682
United States	294,405	37,112
Italy	258,838	28,494
Japan (plus recent gains)	243,586	31,697
Austria	93,913	10,845

When the ships now building are completed, the line-up will be: Great Britain, tonnage, 1,867,250; France, 755,757; United States, 616,275; Russia (less losses),558,432; Germany, 505,619; Italy, 329,357; Japan (plus gains), 253,681; Austria, 149,833.

It is gratifying to us, as Americans, that we are on the way to rise from fifth to third place, passing both Russia and Germany. leaving them fourth and fifth respectively, instead of third and fourth, as at present.

Japan is plucky in being willing, with her 243,586 tonnage and 28,494 men and officers, to tackle Russia with her 416,158 tonnage and 55,208 men and officers.

The tonnage under construction by each nation is as follows: Great Britain, 351,210; United States, 311,870; France, 179,649; Russia, 142,274; Germany, 117,745; Italy, 70,519; Austria, 55,920; Japan, 10,095.

WALTER J. BALLARD.

MANCHESTER SHIP CANAL.

Mail advices give the detailed half-yearly statement of the Manchester Ship Canal Co. as submitted to the stockholders meeting on Feb. 18. It shows receipts for a half year amount to £207,603, while the net revenue for the half year is £101,517. The toll paying merchandise which passed over the canal during the half year amounted to 2,011,090 tons, showing an increase of nearly 200,000 tons over the half year ending Dec. 31. The directors were thus able to pay out of the profits of the half-year the interest due upon the first and second mortgage debentures amounting to £44,742, the interest due on the mortgage of surplus lands amounting to £1,000, and the rent of the transit shed, No. 8 dock, amounting to £3,129; and there was a balance remaining of £52,646. Of that balance of £52,646 the sum of £49,985 has been paid to the Corporation of Manchester, making a total payment of £80,045 for the year 1903 on account of interest due on the debentures they hold. The remainder £2,661 has been retained to recoup the balance of the payments made to the corporation out of the capital funds of the company on account of interest in respect of the years 1900 and 1901.

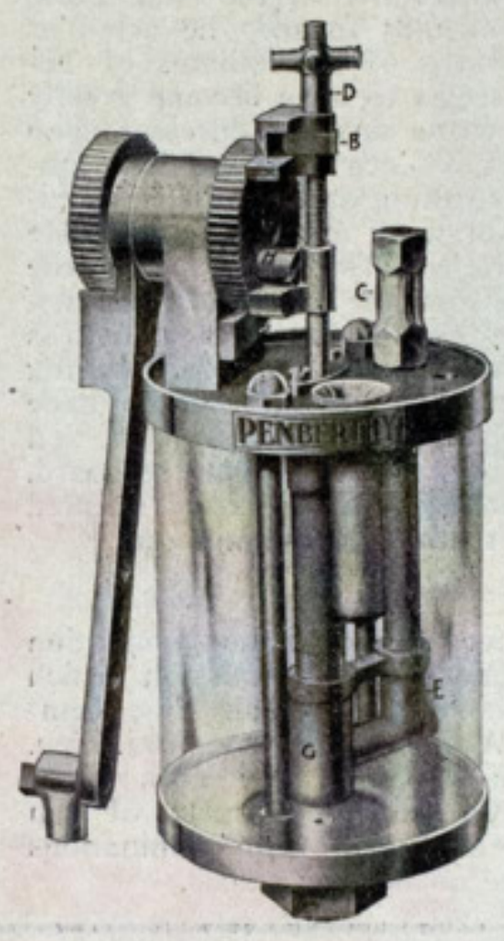
The following is a comparison of the traffic for the ten years during which the ship canal has been open:

	Seaborne traffic.	Barge traffic.	Total.
1894, tons	686,158	239,501	925,659
1895, tons	1,087,443	271,432	1,358,875
1896, tons	1,509,658	316,579	1,826,237
1897, tons	1,700,479	365,336	2,065,815
1898, tons	2,218,005	377,580	2,595,585
1899, tons	2,429,168	348,940	2,778,108
1900, tons	2,784,843	275,673	3,060,516
1901, tons	2,684,833	257,500	2,942,393
1902, tons	3,137,348	280,711	3,418,059
1903, tons	3,554,636	292,259	3,846,895

The seaborne general merchandise traffic showed an increase of 253,371 tons, and coal of 163,917 tons, making a total increase of 417,288 tons for the year as compared with the year 1902.

FORCE FEED LUBRICATORS.

One of the latest inventions in this class of lubricators is shown in the cut.



Its principal features are *first* the two ratchets, one of which is used to drive the plunger, while the other acts on the plunger itself. Secondly the location of the valves which are in the center of the oil reservoir. The advantage of the two ratchets is that they are interchangeable and as the wear only comes on the ratchet to which the lever is attached, when worn to such an extent that the "dog" will not hold, it can be replaced by the ratchet acting on the plunger, and the life of the Lubricator thereby doubled. As the ratchet is the first thing to wear out, this device will be appreciated by engineers. The advantage of having the valves and feed from center of oil reservoir is that they cannot be effected by changes of temperature, and it will therefore feed oils very difficult to feed through hydrostatic cups.

Closing jaws of lubricator with the nut B increases feed, opening them decreases the feed. When the proper amount of oil is being fed, screw down the lock nut D to hold rigidly in place. Extra oil can be had by screwing down the nut B and operating the plunger by hand. The cup can be cleaned from a hole in the bottom designed for that purpose. This lubricator is manufactured by the Penberthy Injector Co. of Detroit, Mich., manufacturers of the well known Penberthy automatic injector.

The department of steam engineering at the Charleston navy yard has been compelled to drop from its pay roll the names of 125 men. The action was made necessary owing to the reduction of about one-half of the amount which it was anticipated the bureau of steam engineering at Washington allowed the Charleston yard for the next fiscal month. For years the steam engineering department has been regarded as one of the steadiest in point of regular employment for its men, and it is a long time since a similar state of affairs has arisen. The list of those discharged comprises skilled machinists and boiler-makers of all grades, as well as many laborers, and the blow will fall heavily upon them. Several vessels are undergoing repairs at the yard, including the cruiser Chicago, the gunboat Alliance and the training ship Cumberland.

The Clyde Line steamship New York reports that she was fired upon by the revolutionary forces at Santo Domingo. She landed her cargo under the guard of United States war vessels.

RETIREMENT OF REAR-ADMIRAL COTTON.

Announcement was made this week by the navy department of the retirement at his own request of Rear-Admiral Charles S. Cotton commanding the European squadron. Rear-Admiral Cotton's request to be retired was because of the continued ill-health of his wife. He has been granted leave of absence abroad for one year. Rear-Admiral French E. Chadwick, on special duty at the naval war college, in Newport, has been ordered to assume command of the European squadron, and will join the Brooklyn when she arrives at Pensacola for repairs. Rear-Admiral Coghlan, who will take the Carribean Sea squadron to the European station after the winter maneuvers, will be succeeded by Rear-Admiral Jewell. This squadron will be somewhat altered in its make-up by that time but the Olympia will remain the flagship. Rear-Admiral Goodrich will succeed Rear-Admiral Glass in command of the Pacific squadron.

Rear-Admiral Charles S. Cotton was appointed an acting midshipman from Wisconsin in 1858. He was promoted to ensign in 1862, lieutenant in 1864, and lieutenant commander in 1866. In 1877 he was commissioned commander, captain in 1892, and rear-admiral in 1900. While an acting midshipman in 1861 he was detached from the naval academy, and was detailed for active duty, and was on the frigate St. Lawrence when she captured the Confederate privateer Petrel. From 1861 until 1863 he was on the frigate Minnesota, the flagship of the North Atlantic blockading squadron. He participated in the action between the Merrimac and the fleet in Hampton Roads. He was attached to the steam sloop Iroquois, off Wilmington, N. C., from March until August, 1864, and was then attached to the steam sloop Oneida of the West Gulf blockading squadron, except for a few weeks of service on board the Hartford and Kineo. Rear-Admiral Cotton was on board the Oneida during the battle of Mobile bay, and the subsequent operations to the surrender of Fort Morgan. From 1865 until 1869 he was on the steam sloop Shenandoah in the East Indies and China. He was attached to the frigate Tennessee in the San Domingo expedition in 1871, and in 1874 he was on the steam sloop Ticonderoga, on the Brazil station. From 1876 until 1880 he was on duty at the New York yard, and for the next three years he commanded the Monocacy on the Asiatic station, with the exception of a period of six weeks, during which time he commanded the Alert on that station. He was inspector of ordnance at the Norfolk yard from 1884 until 1887, inspector of the Fifteenth Lighthouse District from 1887 until 1890, commanded the receiving ship Independence from 1892 until 1894, and from that year until 1897 he commanded the flagship Philadelphia on the Pacific station. Rear-Admiral Cotton was on temporary duty in the Washington yard at the beginning of the Spanish-American war, and was then assigned to the command of the auxiliary cruiser Harvard of the North Atlantic squadron. When the Spanish vessels were destroyed at Santiago, in July, 1898, Admiral Cotton rescued the crews of the Oquendo and Maria Theresa. On the retirement of Rear-Admiral Crowninshield, who was in command of the European squadron, in March, 1903, Rear-Admiral Cotton, who was then in command of the Norfolk yard, assumed the command of that squadron. He would have retired for age in February, 1905. His retirement advances Capt. Caspar F. Goodrich, commanding the Portsmouth navy yard; Com'dr William Everett, and Lieut.-Com'dr F. S. Carter.

Quite an endorsement of the efficiency and safety of Falls Hollow staybolts was recently made by the board of supervising inspectors of steam vessels. The Falls Hollow Staybolt Co., Cuyahoga Falls, O., presented some papers to the board relative to the merits and advantages of the staybolt manufactured by them. This communication was referred by the board of supervising inspectors to the committee on boilers and machinery. The committee examined the data and reported that they found it very instructive and interesting and were of opinion that the Falls Hollow staybolt was safe and efficient to be used in the construction of locomotive and marine boilers.

The schooner Minnie Slauson, owned by Henry & George Burger of Manitowoc has been purchased by Capt. Lars Larson.

U. S. ENGINEER OFFICE. Milwaukee, Wis., Feb. 17, 1904. Sealed proposals for building an Elevator Dredge with Auxiliary Conveyor will be received here until 3 P. M March 19, 1904, aud then publicly opened. Information furnished on application. J. G. WARREN, Major, Engrs. Mar. 17

U. S. ENGINEER OFFICE, 57 Park St., Grand Rapids. Mich., March 2, 1904.—Sealed proposals for dredging harbors on East Shore of Lake Michigan will be received here until 3 p. m., March 17, 1904, and then publicly opened. Information furnished on application. M. B ADAMS, Lieut.-Col., Engrs. Mar. 10

U. S. ENGINEER OFFICE, Milwaukee, Wis., Feb. 9, 1904.—Sealed proposals for moving cribs at southerly ends of breakwaters, Racine and Kenosha Harbors, Wis., will be received here until 3 p.m., March 11, 1904, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engrs. Mar. 10

U.S. ENGINEER'S OFFICE, Jones Bldg., Detroit, Mich., Jan. 15, 1904. — Sealed proposals for rock and earth excavation under continuing contracts, for improving Middle and West Neebish Channels, St. Marys River, Mich , at West Neebish Rapids, will be received here until 2 p. m. (standard time), March 8, 1904. and then publicly opened Information furnished on application. W. H. BIXBY, Major, Eng'rs. Mar. 3

U.S. ENGINEER S OFFICE, Jones Bldg., Detroit, Mich., Jan. 16, 1904. — Sealed proposals for dredging under continuing contracts, for improving Middle and West Neebish Channels, St. Marys River, Mich., at Hay Lake and Mud Lake, will be received here until 2 p. m. (standard time), March 9, 1904, and then publicly opened. Information furnished on application. W. H. BIXBY, Major, Eng'rs. Mar. 3